

Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR 7 — CHART INFORMATION

SECTOR 7

AUSTRALIA—CAPE TOWNSEND TO CAPE GRAFTON

Plan.—This sector describes the E coast of Australia from Cape Townshend NW to Cape Grafton and the inner and outer parts of Great Barrier Reef from Swain Reefs NW to Grafton Passage. The first part of the sector will describe the Great Barrier Reef, the latter part will describe the coastline from S to N, and off-lying islands, islets, and dangers.

General Remarks

7.1 The Great Barrier Reef consists of a group of coral reefs extending in a general NW direction from Swain Reefs to **Anchor Cay** (9°22'S., 144°07'E.), a distance of about 1,000 miles. In general, the reefs follow the trend of the coast as far N as **Cape Direction** (12°51'S., 143°32'E.), where the barrier diverges from the coast in a N direction to Anchor Cay.

The outer edge of the reefs varies in distance from the coast. When viewed from the E, the outer edge appears as a series of oval-shaped or circular patches clustered together. Few of the reefs seem to exceed 2 miles in diameter and a second line of breakers is generally seen inside. Little is known about the outer edge of the reefs between Swain Reefs and the parallel of 20°S. The inner edge of Great Barrier Reef consists of large scattered reefs with deep channels between them. There are many passages, seldom more than 3 miles wide, leading through the reefs to the coast, but only a small portion of them have been examined.

Winds—Weather.—The Southeast Trade Winds prevail throughout the year off this part of the coast. Southwest winds occur 4 to 5 days a month from May to July; NW or N winds occur about 6 to 7 days a month from September to December. The wind is usually moderate, but attains force 7 or more about 20 or 30 days a year. Brief squalls, sometimes of gale force, are fairly frequent with the Southeast Trades.

Land and sea breezes, strengthened by the trade winds, are often strong in the afternoon and may cause a considerable sea. At such times, the wind often shifts to the NE.

Tropical cyclones, called Queensland Hurricanes, occur about 4 or 5 times a year. They are most frequent from December to April, but have occurred in every month except August.

Fog is almost unknown 20 miles or more off the coast and visibility is good, except during heavy rain. At times, there may be some haze with the trade winds. Along the coast, fog or mist sometimes develops at night, but usually disperses soon after sunrise. Such fogs occur 2 or 3 times a month from May to September and sometimes in other months.

Storm warnings and weather information are broadcast by radio.

Tides—Currents.—The current appears to set N within 10 miles of the outer edge of Great Barrier Reef, the rate depending to a great extent on the strength of the wind. During the months of the Southeast Trades (April to November), a con-

tinuous N set will be experienced, except in certain areas where the tidal currents are predominant.

From May to November, close to the outer edge of the reefs between Flinders Passage and One and a Half Mile Opening, the current has always been found to set S, parallel with the line of reefs. It appears to be little affected by the prevailing SE winds. The rate of the current is diminished by the W flood current and increased by the E ebb current; the greatest strength being about 1.5 knots. In the former case, the water sets through the reef openings in a SW direction towards the coast.

Within the above-mentioned limits, 20 to 30 miles from the outer edge of Great Barrier Reef, the current is very uncertain and somewhat weaker. During the months of the Southeast Trades, a surface drift varying in strength up to about 1 knot will be found to set in a NW direction. Very often, when the wind subsides, a reactionary flow in the opposite direction will be experienced.

The tidal currents set through the openings in the Great Barrier Reef in a W or SW direction on the rising tide and in an E or NE direction during the falling tide. In the wider openings these tidal currents are only slight, but in the narrower openings their rates may be as high as 2 knots at springs, increasing to 3 knots if the moon has a high declination at springs.

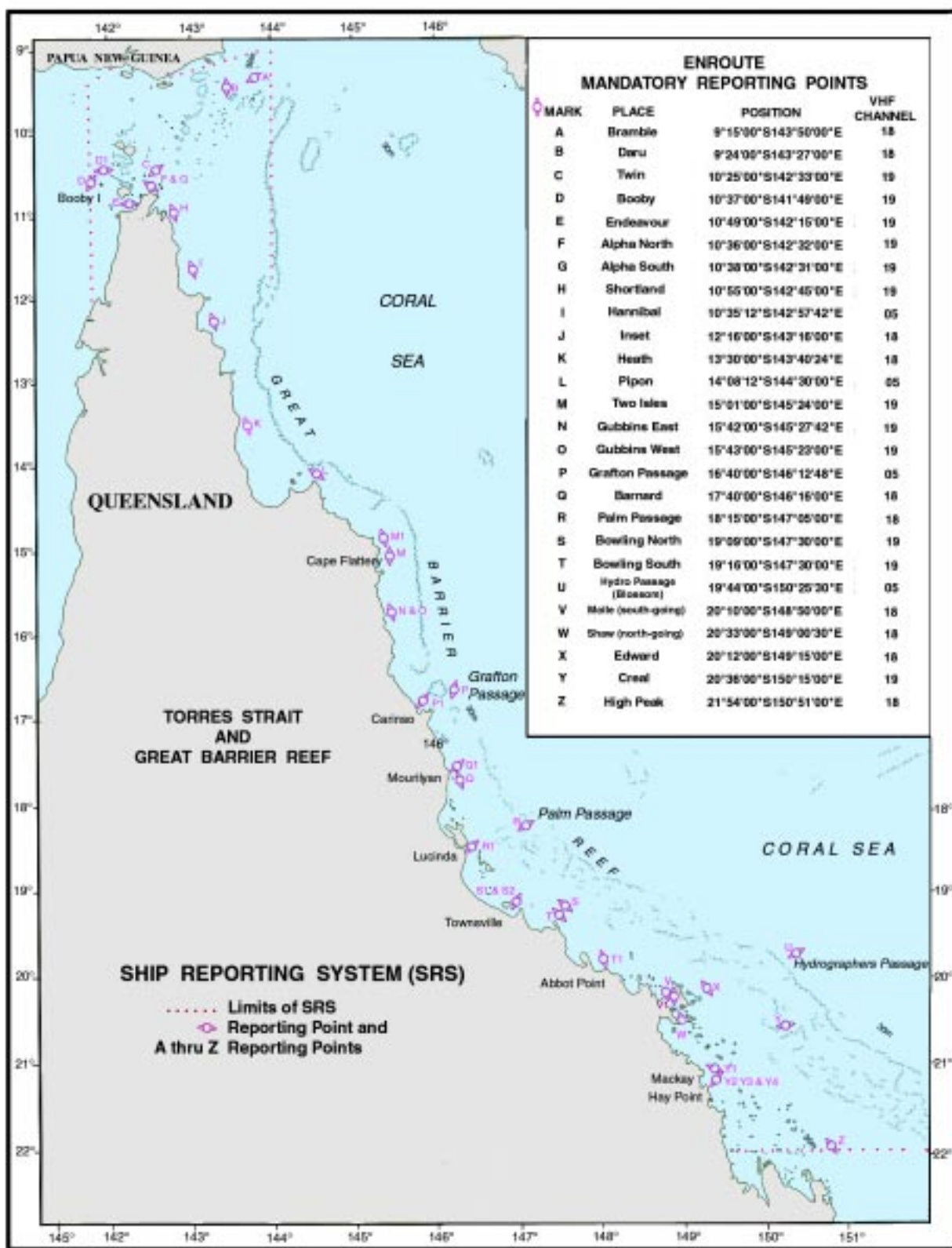
A nominal rise and fall of the tide will, when the sea is smooth, entirely alter the appearance of the reefs. At LW, their margins show clearly and large masses of rock occasionally appear. The interior, or lagoon part of the reef, is then of a light green color, contrasting sharply with the darker blue of the channels between them. As the tide rises, these characteristics become less and less distinct.

Cays, composed of dead, bleached, coral fragments, form on some of the reefs, but their position and extent are known to shift considerably and at times they erode completely, only to reappear some years later.

Vessels should use the main examined openings, even though some of the other openings may appear to be clear of dangers. As a general rule, the waters lying between the latter and the Inner Route have not been examined.

Caution.—Vessels navigating in the vicinity of the outer edge of the Great Barrier Reef or through any of its passages are cautioned to keep a good lookout and to take frequent soundings. All passages from seaward through the Great Barrier Reef between 11°40'S and 19°07'S have been swept and are open to surface navigation. Due to sunken mines, it is not safe for anchoring, dredging, trawling, cable laying, or resting on the bottom by submarines. Most of the area has been examined, but little is known of the outer edge of the reefs between Swain Reefs and the parallel of 20°S.

Military exercises are conducted off this section of the Australian coastline. For further details, see Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.



Navigation in the Great Barrier Reef

7.2 Compulsory pilotage.—The Great Barrier Reef Marine Park Act 1975 requires all vessels of 70m or greater in length, including all oil tankers, chemical tankers, and liquefied gas carriers of any length are to carry a pilot for the inner passage through the Great Barrier Reef (GBR). A pilot must be licensed under Commonwealth, State, or Territory law, when taking passage, as follows:

1. Through the inner route of the Great Barrier Reef between the parallels of Cape York (10°41'S) and Cairns Roads (16°40'S).
2. Through Hydrographer's Passage (19°47'S., 150°24'E.).
3. Through Whitsunday Passage (20°20'S., 148°54'E.) and in the vicinity of the Whitsunday Group and the Lindeman Group.

In addition to the legislation that applies to the Great Barrier Reef Marine Park, the International Maritime Organization (IMO) recommends that ships transiting Torres Strait and Great North East Channel make use of the available pilotage due to the navigational complexity and environmental sensitivity of the region.

The Australian Maritime Safety Authority (AMSA) also recommends that Masters who are not familiar with the sections of the Inner Routes of the Great Barrier Reef, Palm Passage, and Grafton Passage, employ the services of licensed pilots.

Penalties.—It is an offense for a ship of the size and type specified to navigate without a pilot in the compulsory area; the master and owner each will be liable to a fine. Similarly, liabilities are also imposed on vessels that had entered an Australian port previously in the GBR area without a pilot, with a 3-year statute of limitations.

Queensland Coast and Torres Strait Pilot Services—Draft limitations and service.—Licensed pilots will pilot vessels through Gannet Passage, Varzin Passage, Prince of Wales Channel, and Torres Strait with a maximum draft up to 12.2m. The draft limitation of 12.2m applies only to vessels transiting the Great Barrier Reef Inner Route from Torres Strait (Booby Island) to Cape Flattery or through the Great North East Channel to Dalrymple Island.

Vessels entering or leaving the Inner Route by way of Grafton Passage, Palm Passage, and Hydrographer's Passage are restricted by draft limitations at the Australian port of call

or departure from it. The minimum underkeel clearances are, as follows:

1. Gannet and Varzin Passages—1.0m.
2. Prince of Wales Channel—1.0m for vessels with a draft less than 11.9m, or a clearance of 10 per cent of draft for vessels that exceed 11.9m.

Pilotage and boarding arrangements.—Pilot services in the Torres Strait (including the Great North East Channel) and the Great Barrier Reef are provided by three private companies, as follows:

1. Australian Reef Pilots ("Reef Pilots").
2. Torres Pilots.
3. Hydropilots PIL ("Hydro Pilots Helicopter")—Hydrographers Passage only.

Boarding by helicopter is used as an alternative to launch services at some pilot boarding places (PBP) and for Hydrographers Passage. Boarding by helicopter, when used, is by land-on operation only. Masters should consult Marine Orders Part 57 and the Australian Code of Safe Practice for Ship Helicopter Transfers or the International Chamber of Shipping Guide to Helicopter/Ship Operations and confirm that the vessel is suitable for a land-on operation when ordering a pilot at a boarding place where this practice is an option.

A line will be required to lift aboard the pilot's luggage and equipment (usually two items).

Helicopters are restricted to land-on operations under visually clear and moderate weather conditions. Winch-down transfers are not undertaken in Australia.

Requesting pilotage by inbound vessels.—Contact pilots, preferably 5 days before arrival, informing the boarding place with ETA (UTC+10 hours), vessel's deepest draft, and the destination. All messages are acknowledged by the pilots, who will also advise on ETA update requirements.

Requesting pilotage by outbound vessels.—Arrangements are made directly with the Pilots Office or by the ship's agent.

Pilotage for Torres Strait, including the Great Northeast Channel.—Pilot boarding arrangement may be made for any port in Queensland, New South Wales, Northern Territory, or Papua New Guinea at any of the following pilot boarding places listed in the table titled "Torres Strait Pilotage."

Deep Water Route.—A Deep Water Route has been established for deep draft vessels between the Barrow Islands (14°22.5'S., 144°41.6'E) and Lizard Island (14°40.2'S., 145°24.7'E).

Torres Strait Pilotage				
Port and Pilot Boarding Place		Position	VHF channel	Pilot boards by
Brisbane	Point Cartwright	26°43'S, 153°11'E	16	Launch.
Gladstone	North Point	23°44'S, 151°22'E	12 and 16	Launch or helicopter.
Whitsunday	Penrith Island	21°00'S, 149°57'E	9 and 16	Helicopter.
Whitsunday	Bailey Island	21°00'S, 149°36'E	9 and 16	Helicopter.
Palm Passage	Pith Reef	18°13'S, 147°07'E	9 and 16	Helicopter.
Cairns	Yorkeys Knob	16°44'S, 145°45'E	20	Launch or helicopter.
Grafton Passage	Euston Reef	16°39'S, 146°14'E	20	Launch or helicopter.
Torres Strait	Goods Island	10°34'S, 142°04'E	20	Launch or helicopter.
Torres Strait	Booby Island	10°36'S, 141°50'E	20	Launch or helicopter.

Torres Strait Pilotage				
Port and Pilot Boarding Place		Position	VHF channel	Pilot boards by
Great North East Channel	Dalrymple Island	9°34'S, 143°24'E	20	Launch.

Two-Way Route.—A Two-Way Route has been established between the Palm Isles (18°25'S., 145°31'E) and the Low Isles (16°23'S., 145°33'E), continuing to Booby Island (10°36'S., 141°55'E). The use is not mandatory, but it does indicate the best and safest route.

Pilot Contact—Australian Reef Pilots	
Brisbane Head Office	
Fax:	61-7-3262-5633
Telephone:	61-7-3262-4600
E-mail:	arp@powerup.com.au
Internet:	http://www.reefpilots.com.au
Mackay Pilot Station	
Fax:	61-7-4953-0736
Telephone:	61-7-4957-4877
E-mail:	hydropil@tpgi.com.au
Cairns Pilot Station	
Fax:	61-7-4055-7828
Telephone:	61-7-4055-8311
Thursday Island Pilot Station	
Fax:	61-7-4069-1570
Telephone:	61-7-4069-1570
E-mail:	arptis@bigpond.com.au
Note. —The VHF call sign for all of the above is REEFPILOTS.	

Pilot Contact—Torres Pilots	
Brisbane Operations Offices	
Fax:	61-7-3217-9722
Telephone:	61-7-3217-9544 (24 hours)
E-mail:	operations@torrespilots.com.au
Internet:	http://www.torrespilots.com.au
Pilot Base—Thursday Island	
Fax:	61-7-4069-2252
Telephone:	61-7-4069-2251 (24 hours)
E-mail:	torresti@bigpond.com.au
Pilot Base—Great North East Channel	
Fax:	Contact through Thursday Island
Telephone:	Pilot Base
Pilot Base—Hamilton Island	
Fax:	61-7-4946-8280
Telephone:	61-7-4946-8249
E-mail:	torres@whitsunday.net.au
Note. —The VHF call sign for all of the above is TORRESPILOTS.	

Area to be Avoided.—The area of the Capricorn Group and the Buker Groups in the S area of the Great Barrier Reef is

designated an Area to be Avoided. Ships exceeding 500 grt should avoid the area bounded by a line connecting the following positions:

- a. 23°10'S, 151°56'E.
- b. 23°53'S, 152°28'E.
- c. 23°55'S, 152°28'E.
- d. 23°57'S, 152°26'E.
- e. 23°57'S, 152°24'E.
- f. 23°32'S, 152°55'E.
- g. 23°36'S, 151°39'E.
- h. 23°33'S, 151°35'E.
- i. 23°30'S, 151°35'E.
- j. 23°25'S, 151°53'E.
- k. 23°20'S, 151°50'E.
- l. 23°20'S, 151°40'E.
- m. 23°15'S, 151°40'E.
- n. 23°10'S, 151°52'E.

Mandatory Ship Reporting System

7.3 Mandatory Ship Reporting System (REEFREP SRS).—The ship reporting system (SRS) covering the Torres Strait and the inner route of the Great Barrier Reef entered into force on 1 January 1997:

1. The SRS, known as “REEFREP,” has been formally adopted by the International Maritime Organization (IMO) under the terms of the International Convention for the Safety of Life at Sea (SOLAS), 1974 and is mandatory for those categories of ships listed in paragraph 2 below.
2. Ships of the following general categories are required to participate in the reporting system:
 - a. all ships of 50m or greater in overall length;
 - b. all oil tankers, liquefied gas carriers, chemical tankers or ships coming within the INF Code, regardless of length (See paragraph 3 below).
 - c. ships engaged in towing or pushing where the towing or pushing vessel or the towed or pushed vessel is a vessel prescribed within the categories in paragraphs “a” or “b” or where the length of the tow, measured from the stern of the towing vessel to the after end of the tow, exceeds 150m.
3. For the purposes of the requirement in sub-paragraph 2b “oil tanker” means ships defined at Regulation 1(4) of Annex I to MARPOL 73/78 together with those ships other than oil tankers to which Regulation 2(2) of Annex I to MARPOL 73/78 applies, that is, ships “fitted with cargo spaces which are constructed and utilized to carry oil in bulk of aggregate capacity of 200 cubic meters or more.”

REEFREP—Torres Strait and Great Barrier Reef (Inner Route) Ship Reporting System

<http://www.amsa.gov.au/AUSSAR/ausreef.pdf>

Purpose.—The purpose of the SRS is to enhance navigational safety, thereby minimizing the risk of a maritime accident and consequential pollution and major damage to the marine environment. The areas covered by the SRS are internationally recognized as being of outstanding environmental and social importance.

System overview.—The SRS is based on a VHF voice reporting system employing a radio network, presently consisting of 14 sites (three of which are satellite VHF), along the Queensland coast and on islands in the Torres Strait. There are also four additional stand-by sites situated at High Peak, Mount Mackay, Palfrey Island, and Hammond Island.

Through this network certain categories of ships are required to report their entry into, and progress through, the SRS area with reference to a series of designated points.

There are also radar sites at selected focal points within the SRS area. The radar stations monitor vessels entering the SRS area and their compliance with the reporting requirement.

In the Torres Strait there are two radars, one at Cairns and one in the S area of the inner route on Penrith Island.

The VHF radio sites are remotely controlled from a Ship Reporting Center (REEFCENTER), set up at Hay Point near Mackay, as are the radars. REEFCENTER, staffed by operators from Queensland Transport, manages the system on a 24-hour basis.

Mandatory Reporting Procedure.—The SRS requires ships to report certain information to REEFCENTER, radio call sign “VZQ 641.” Full details of the SRS procedures, including message format, communications arrangements, and reporting points, are provided in the publication AUSREP and REEFREP Ship Reporting Systems—Ship Reporting Instructions for the Australian Area, available free of charge from:

1. Any office of the Australian Maritime Safety Authority (AMSA).
2. Queensland Transport (Maritime Division) in Brisbane.
3. Offices of the Regional Harbor Master in Queensland ports.

Australian Maritime Safety Authority

<http://www.amsa.gov.au>

Information required in REEFREP.—Alphabetical lists refer to IMO message format fields:

Field	Meaning
A	Name, call sign, and IMO/Lloyd's number.
C	Name of Mandatory Reporting Point (MRP) at which they are reporting or the position in latitude and longitude if not at or in the vicinity of an MRP.
E	Name of next MRP or course if not tracking between MRPs.
F	ETA and next MRP or speed.

Field	Meaning
J	Whether coastal pilot on board (“Yes” or “No”) and pilot details.
L	Name of final MRP at which ship is expected to leave the SRS Area.
O	Draft.
P	Type of cargo being carried and whether it is classed as hazardous (“Yes” or “No”).
Q	Any damage, defects, deficiencies, or other limitations affecting the ship when it enters the SRS Area or which arise while the ship is in the area.
R	In the event of a Dangerous Goods (DG) incident, a Harmful Substances (HS) incident, or Marine Pollutants (MP) incident, the ship is required to report details.
U	Ship details comprising ship type, length, and gross tonnage.
X	Any additional information considered relevant to navigational safety in the SRS Area.

AUSREP/REEFREP Interface.—A two-way data exchange method is implemented between the SRS and the existing AUSREP system, operated from Australian Maritime Safety Authority (AMSA) Rescue Coordination Center (RCC), Canberra. Ships participating in both AUSREP and the REEFREP systems during their transit of the REEFREP SRS area will be provided with a reporting service by the REEFCENTER and the RCC. That is, while in the SRS area, a ship reports to the REEFCENTER and does not report to the RCC for AUSREP, except when AUSREP participants are departing a port in Queensland within the REEFREP area; in this instance, an AUSREP Sailing Plan (SP) is submitted to the RCC (preferably via INMARSAT C or facsimile) prior to a departure from the port. The voyage details contained in the SP will then be relayed to the REEFCENTER in readiness for the ship's VHF report at the first mandatory reporting point in the REEFREP SRS. The reason for this procedure is to avoid long detailed reports via VHF.

Entering the REEFREP SRS Area.—On first entering the SRS operational area from outside the area or when sailing from a port within the reporting area, ships are required to provide a position report (PR), including details such as identity, position, intended route, cargo and other supplementary information, when at the first designated SRS Reporting Point. The extent of the report will depend on whether the reporting vessel has previously sent a Sailing Plan (SP) message into the AUSREP system (AUSREP SP). If a ship is already an AUSREP reporter on first entry to the SRS the REEFREP system will require a brief PR from that vessel.

Communications.—Ships reporting into the SRS are to use voice on VHF channel 5, 18 or 19 with REEFCENTRE.

Masters who are concerned as to the security of providing cargo details over VHF can provide this information separately from the voice message by other means, such as telephone, prior to the first REEFREP report if so desired.

When, for any reason, communication is not possible, ships are to pass the required report in a timely manner by alternative means employing one of the following methods:

- a. INMARSAT C, through Perth LES, using special access code (SAC) 43.
- b. HF radio through any Australian Coast Radio Station.
- c. INMARSAT A, B or M.
- d. Commercial VHF coastal network.
- e. Telephone: 61 (0) 7-4956-3581.
- f. Facsimile: 61 (0) 7-4956-3367.
- g. Telex: AA 46483.

Swain Reefs to Flinders Passage

7.4 Swain Reefs (22°00'S., 152°30'E.) lie with their S extremity about 120 miles E of Cape Townshend and 142 miles NNW of **Sandy Cape** (24°42'S., 153°16'E.). The sea breaks heavily on the outer edges of the reefs, and in good weather may be seen from a distance of 6 to 7 miles. Reefs and cays, S of latitude 21°34'S, and between the meridians 152°20'E and 152°42'E, have been reported.

Hixson Cay (22°21'S., 152°40'E.), near the S extremity of Swain Reefs, is awash at HW. Another small cay, 3.7m high, lies 1 mile SSW of Hixson Cay. Both Cays are bare of vegetation. When approaching Swain Reefs from the S, the bottom is irregular and caution is necessary. Small vessels may obtain anchorage, in a depth of 64m, coral, 1.5 miles SE of Hixson Cay. Caution is necessary at all times as these cays have been noted to disappear at certain tide conditions.

The reefs, which lie between 9 and 22 miles NNE of Hixson Cay, were reported to lie 4 miles farther W than charted.

Two openings in the reefs, with anchorage just within, lie 10 miles NE and 31.5 miles N, respectively, of Hixson Cay. The S opening is 0.7 mile wide, with depths 46 to 55m in mid-channel. As this opening lies obliquely to the general line of the reefs, it is not easily seen until well open. The N opening is 1 mile wide, with depths of 33 to 37m in mid-channel. A depth of 37m was reported to lie 10 miles E of the S opening. A stranded wreck was reported to lie 4.5 miles N of the S opening.

Drying reefs extend 7 miles WSW from Hixson Cay. Howard Patch lies 5 miles WSW of Hixson Cay. Discolored water has been reported S of Howard Patch and Hixson Cay.

Zodiac Cay (21°07'S., 152°40'E.), at the N extremity of Swain Reefs, is 2.4m high, composed of lumps of coral and sand, and lies on the middle of a reef. There are sand cays on the reefs, which extend between 4.5 and 6 miles E of Zodiac Cay. There are shoal patches in the area of Zodiac Cay, and extreme caution is necessary.

Anchorage is afforded, in a depth of 42m, about 1 mile NW of Zodiac Cay.

The inner edges of Swain Reefs extend NW from Howard Patch and consist of Herald No. 1 Reef, Heralds Prong No. 2 Reef, Heralds Prong No. 3 Reef, and Heralds Reef Prong. All

the above reefs dry. A tower, conspicuous on radar, stands on Gannet Cay, 14 miles ENE of Herald No. 1 Reef.

The SW edge of a line of submerged coral reefs and foul ground extends NW for 7 miles from a position 11 miles W of Heralds Prong No. 3 Reef.

Bell Cay (21°46'S., 151°15'E.), a small sand cay near the N edge of a drying reef, lies 11 miles SW of Heralds Prong No. 3 Reef. The cay is covered with a sparse growth of bushes. There are large boulders on the E edge of the reef, on which the sea breaks heavily.

Anchorage may be obtained off the N side of the reef, in a depth of 37m, but the bottom is hard and uneven.

Great Barrier Reef—Outer Edges

7.5 From the NE extremity of Swain Reefs, located about 80 miles N of Howard Patch, the outer edge of the reefs curve abruptly in a WNW direction for about 150 miles to a position about 100 miles E of the N extremity of **Gloucester Island** (20°00'S., 148°27'E.). This area has been partially examined and little is known about this portion of the outer edge of the reefs. From the last position, the outer edge of the reefs continues in the same direction for a distance of about 140 miles to the entrance to Flinders Passage, the first important passage through the reefs from the S.

Numerous detached reefs exist from the outer edge of Great Barrier Reef between Flinders Passage and Grafton Passage, 165 miles NW. None of these reefs are of very large extent and nearly all the outer ones are awash or dry. Depths outside the line of reefs for a distance of about 1 mile are less than 73m. Farther outside, the depths increase sharply to more than 200m.

The principal passages through the reefs in this area are Flinders Passage, Magnetic Passage, Palm Passage, Flora Pass and Grafton Passage. Other openings are Geranium Passage and Noggin Passage. These passages all lead into the Inner Route and to the various ports on the NE coast of Australia.

Flinders Passage

7.6 The seaward entrance of **Flinders Passage** (18°55'S., 148°00'E.) lies to the E of the reef located with its N extremity in a position of 18°44'S, 147°58'E. The general direction of the channel is nearly N and S. It is about 20 miles long and from 1.5 to 7.5 miles wide, and bounded on either side by reefs.

The inner or S entrance lies between the SE end of **Bowden Reef** (19°03'S., 147°56'E.) and the W side of Mid Reef, 8 miles to the ESE. Both of these reefs are marked by boulders and the sea breaks over Mid Reef. Depths in the channel are irregular.

Flinders Passage, although frequently used, has not been closely examined. Navigators should use the passage only under favorable conditions and it is imperative that a good lookout be maintained. The passage is not recommended for deep-draft vessels. The many reefs E and W of the passage can best be seen on the chart.

Magnetic Passage and Palm Passage

7.7 Magnetic Passage (18°30'S., 147°15'E.) lies with its N entrance about 50 miles NW of the N entrance to Flinders Passage. The passage is entered from seaward between

Myrmidon Reef (18°15'S., 147°22'E.) and Needle Reef, 11.5 miles SW. Both reefs dry 2.7m. The passage extends in a S direction for about 22 miles and then in a SSW direction for about 11 miles to its S entrance, which lies between Lodestone and Keeper Reefs.

Thimble Shoal, with a depth of 7.9m, has been reported to lie 3 miles E of Needle Reef. Charts show the shoal close to the recommended track, therefore, it is recommended deep-draft vessels use Palm Passage.

The current sets ESE between the outer reefs, but its influence is generally lost after passing S of Needle Reef.

Palm Passage (18°19'S., 147°00'E.) lies with its seaward entrance about 8 miles WNW of Magnetic Passage. The passage leads SW into the Inner Route in the vicinity of the Palm Isles. The seaward entrance lies between Pith Reef and **Urchin Shoal** (18°20'S., 147°05'E.), and the S entrance between Bramble Reef and Rib Reef.

Pith Reef (18°12'S., 147°02'E.), which dries, lies on the W side of an area of foul ground on the W side of the seaward entrance. A light is shown on the SE side of the reef; a racon is situated at the light. In 1983, Pith Reef was reported to lie 0.5 mile E of the charted position.

Rib Reef (18°28'S., 146°52'E.), which dries, lies in the middle of the SW end of Palm Passage. There is a navigable channel 4 miles wide on each side of the reef. A light is shown on the NE side of Rib Reef.

Pilotage.—See paragraph 9.1 for applicable pilotage information.

When within the outer ends of the reefs, the tidal current, if any, will be found to set in the direction of the channel. The area NW of Pith Reef, Trunk Reef, and Bramble Reef is unsurveyed. A vessel reported (1972) that when outbound through the passage, the 191m summit on **Fantome Island** (18°42'S., 146°31'E.), bearing 230° astern, was a useful mark for maintaining the recommended track and was visible for a distance of 30 miles.

Between Pith Reef and the N entrance to Geranium Passage, 47 miles NW, the outer edge of the Great Barrier Reefs consists of a large number of detached reefs which have not been surveyed.

Geranium Passage and Noggin Passage

7.8 Geranium Passage (17°42'S., 146°30'E.) lies about 48 miles NW of Palm Passage. The seaward entrance lies between the N extremity of **Potter Reef** (17°40'S., 146°34'E.) and the S extremity of **Gilbey Reef**, 4.5 miles NNE. The passage has a length of about 12 miles and extends in a general SW direction. It is from 1.7 to 3 miles wide and leads into the Inner Route in the vicinity of Mourilyan Harbor. Navigators are cautioned that although this passage is apparently clear of dangers, it has only been partially examined. Eddy Reef and Ellison Reef form the SW entrance to Geranium Passage.

Between the N entrance to Geranium Passage and the NE entrance to Noggin Passage, 28 miles NNW, the outer edge of the Great Barrier Reef consists of a number of detached reefs which have not been surveyed.

Noggin Passage (17°13'S., 146°25'E.) is located about 28 miles N of Geranium Passage. The seaward entrance lies between Raaf Shoal and Noggin Reef, about 5 miles NW. The

passage trends in a WSW direction for a distance of about 13.5 miles to its inner entrance, which lies between Flora Reef and Jackson Patches. The passage is from 2 to 3.5 miles wide and leads to the Inner Route in the vicinity of **Russell Island** (17°14'S., 146°06'E.). Depths of 16.4 to 69m are found in the fairway of the passage, the least depth being found about 3 miles E of the E side of **Coates Reef** (17°12'S., 146°22'E.). A 9.1m shoal lies in the seaward approaches of Noggin Passage, 3 miles NNE of Raaf Shoal.

Flora Passage

7.9 The seaward entrance to **Flora Passage** (17°00'S., 146°21'E.), located about 17 miles NNW of the seaward entrance of Noggin Passage, lies between Channel Reef and Northwest Reef, about 4.2 miles NNW. The passage extends about 19 miles SW to its inner entrance, which lies between Scott Reef, on the N, and the N side of Flora Reef, on the S. The passage is from 3.7 to 6 miles wide and leads to the Inner Route in the vicinity of Russell Island.

Great caution is necessary approaching Flora Passage from seaward, as the mainland, though high, is often obscured by haze, and should not be attempted unless the position is accurately known. A mid-channel course will lead a vessel clear of dangers in Flora Passage.

Cape Townshend

7.10 The coast between Cape Townshend and West Hill Island, about 60 miles WNW, is indented SSE by two large bays, each of which is about 30 miles long. Shoalwater Bay, the E of the two, is separated from Broad Sound, the W bay, by a large peninsula, the N end of which, Arthur Point, lies about 25 miles WNW of Cape Townshend. Several contiguous islands lie up to about 8 miles NNW of this peninsula, and the entrances of both bays are somewhat encumbered by small groups of islets.

There are depths of more than 10.9m in the N parts of the above bays, but in their S parts there are depths of about 7.3 to 10.9m. The depths decrease toward the S end of both bays where there are numerous dangers.

The tidal currents are strong on this part of the coast. In Broad Sound Channel, the flood current sets W and the ebb E at a rate of about 2 to 3 knots. In the entrances of the two above bays, the currents tend to follow the trend of the channel and attain a rate of 2 to 3 knots.

Shoalwater Bay

7.11 Shoalwater Bay (22°23'S. 150°23'E.) indents the coast about 30 miles SSE between Cape Townshend and **Arthur Point** (22°08'S., 150°04'E.). The bay is fairly easy to access through the deep channels on either side of the islands in the entrance. There are depths of 12 to 30m in North Channel and 3.6 to 15m in Northwest Channel. In the central part of the bay, there are depths of 0.3 to 12.5m.

Caution is advised when entering the bay because recent soundings indicate uncharted shoals exist in several areas.

Tides—Currents.—The flood current sets SW; the ebb current NE.

Pilotage.—No pilots are available for Shoalwater Bay.

Anchorage.—Anchorage, with shelter and good holding ground, may be obtained, in a depth of 16m, 1.5 miles N of **White Rocks** (22°12'S., 150°15'E.). Anchorage, with good holding ground, may be obtained, in depths of 13 to 18m in the blind channel, 2.5 miles SE of the NE extremity of **Akens Island** (22°21'S., 150°17'E.). Local knowledge is necessary for this anchorage. There is anchorage, in depths of 13 to 18m, 1 mile N of **Passage Patch** (22°22'S., 150°23'E.).

Anchorage, sheltered from SE winds and easy of access, may be taken 1.2 miles off the middle of the W side of **Leicester Island** (22°16'S., 150°27'E.), in depths of 13 to 18m.

Caution.—The flood currents set SW; the ebb currents set NE. The currents may attain rates of 2 to 6 knots in the anchorage W of Leicester Island.

A military training area has been established within Shoalwater Bay. The waters within the area are closed to public access during training exercises.

All creeks within the area are closed to public access. Shelter from storms may still be sought at Freshwater Bay, Port Clinton, Pearl Bay, and the mouth of Island Head Creek.

Broad Sound

7.12 Broad Sound (22°12'S. 149°45'E.) extends SSE for approximately 22 miles between the peninsula, of which Arthur Point is the N extremity, and the mainland W, and is entered between that point and **West Hill Island** (21°50'S., 149°29'E.). A chain of islands, islets, and rocks extends across the entrance, through which there are three main channels.

There are depths of 18m in the N part of the sound, decreasing gradually towards its head, but there are extensive banks and flats off the E shore and at its head.

Broad Sound Channel (22°07'S., 150°17'E.), the S approach to Broad Sound, trends WNW from Cape Townshend to the wide N entrance to the sound. This channel lies between the S side of the Northumberland Isles and the islands and dangers in the entrance of Shoalwater Bay and Broad Sound. It is about 10 miles wide between Cape Townshend and Steep Island, but it narrows to about 2.5 miles between the North Point Islands and Boomerang Shoal and Lake Shoal.

Tides—Currents.—The tidal range in Broad Sound reaches a maximum of 10.9m at the mouth of Herbert Creek and is much greater than anywhere else on this part of the coast. In the entrance to the sound the flood current follows the trend of the channels and sets between W and S into the sound, and the ebb sets in the opposite direction. They have a rate of 2.5 to 3 knots in the larger channels, where the channel is confined, as in Race Passage, where they attain a rate of 3 to 4 knots at springs.

In the sound, the tidal currents turn soon after HW and LW by the shore, that is about 30 minutes after HW and LW at Saint Bees Island. In the approaches, however, during strong SE winds, the flood current setting W runs for nearly 2 hours after the time of HW by the shore, that is 2 hours 30 minutes after the time of HW at Saint Bees Island.

In the entrances of Saint Lawrence Creek and Waverly Creek, the tide rises rapidly; the flood current runs for about 3 hours 30 minutes while the ebb current for about 8 hours 30 minutes. The wind considerably affects the tide, with N winds

retarding and lessening them and SE winds accelerating and increasing the tidal rise.

Depths—Limitations.—There are depths of 10.9 to 20.1m over much of the N part of the sound. In the larger entrance channels, there are depths of more than 10.9m, but in the smaller ones, there are depths of less than 1.8m.

7.13 North Point Passage (22°02'S., 149°53'E.), which enters Broad Sound from the NE, lies between North Point and the North Point Islands. It has a least depth in the fairway of about 7.9m and a least width of about 0.5 miles between Gannet Rock and North Point Cays.

Main Channel, the best channel into Broad Sound, lies between the North Point Islands and **Middle Shoals** (21°57'S., 149°44'E.). It has depths of 11 to 18.3m and is about 4.5 miles wide. In 1974, a depth of 7.9m was reported in Main Channel, 2 miles ENE of the NE end of Middle Shoal.

Flat Island Passage (21°59'S., 149°37'E.) enters the sound from the N through the Flat Islands. Although it has depths of 10.9m to 14.6m, it should not be attempted without local knowledge.

Anchorage.—On the W side of the sound, the best anchorage, sheltered from all but N and NE winds, is in about 8.3 to 10.1m, about 1 mile NW of the N end of **Aquila Islet** (21°58'S., 149°35'E.).

Anchorage may be obtained midway between **Roundish Islet** (22°03'S., 149°37'E.) and Flock Pigeon Islet, in a depth of 9.1 to 10.9m, but although the tidal currents are weak, the anchorage is exposed.

At the head of the sound, small vessels with local knowledge may anchor, in 7.3 to 12.8m, close W of Turtle Islet. Anchorage may also be taken in the mouth of Herbert Creek, about 0.7 mile offshore and about 1 mile ESE of **Charon Point** (22°23'S., 149°49'E.), in 5.5 to 7.3m.

On the E side of Broad Channel, the bottom is rocky N of West Side Islet and unless vessels are able to anchor in Burkitt Roads, they should not anchor in this area.

Off-lying Islands

7.14 The Northumberland Isles consists of a number of groups of small islands and islets which lie between a position about 12.5 miles ENE of Cape Townshend and a position about 21 miles E of **Hay Point** (21°17'S., 149°18'E.). Within these limits there are many islands, islets, and dangers that are practically contiguous with some of the coastal islets and dangers.

The Northumberland Isles fall into two groups, the E group and the W group. High Peak Island, with the islets and dangers in its vicinity, and the Percy Isles make up the E groups. The W groups from S to N, consist of the Duke Islands, the Bedwell Group, the Guardfish Cluster, and the Beverly Group.

Several courses for the Inner Route pass between the E and W groups. This makes it possible for the navigator to concern himself only with the islands adjacent to his track and not necessarily with the coast itself. Many of the high, steep-to islands are good navigation marks, and lights are shown from them. The inner edge of the Great Barrier Reef lies about 20 to 31 miles NE of the E groups of the Northumberland Isles. The rates and directions of the tidal currents are shown on the charts.

The Northumberland Isles—East Groups

7.15 High Peak Island (21°57'S., 150°42'E.) lies about 18.5 miles NE of Cape Townshend. A conspicuous peak rises to a height of 221m on the N end of the island. The island was reported to give good radar returns up to 26 miles. A light is shown on the summit of the innermost of two, high, conical rocks, which lie close off the E end of the island. Berwick Island and Rothbury Island lie about 1.7 and 4 miles, respectively, SW of High Peak Island.

Anchorage, sheltered from SE winds, may be obtained with local knowledge off a small sand and coral beach at the head of the S cove on the W side of High Peak Island, in depths of 27 to 33m. Depths of less than 11m extend 0.4 mile from the beach.

Cheviot Island (22°05'S., 150°40'E.) lies 7 miles S of High Peak Island and 12 miles ENE of Cape Townshend. A drying rock lies 0.1 mile N of the island, and there are tide rips off the S side of the island. Cheviot Island is the SE island of the E group.

Low Rock, 6m high, lies about 11.5 miles W of High Peak Island. This dangerous rock lies close E of the track through the Inner Route. A 17.3m patch lies approximately 1 mile, bearing 211° from Low Rock. If Steep Island is identified, there is no difficulty in avoiding this danger.

Steep Island (22°02'S., 150°27'E.), with a double summit and thickly wooded, lies 12.5 miles WNW of Cheviot Island. The island is an excellent landmark when approaching this part of the Northumberland Isles and is easily distinguished at night in clear weather.

The **Percy Islets** (21°39'S., 150°19'E.) extend about 20 miles NW from the Southeast Islets to the Hotspur Islets. This distinct group of islands and islets consists of the Southeast Islets, South Island, Middle Island, the Pine Islets, and a number of rocks and shoals. A light is shown on the SW side of Pine Islets. Pine Peak Island lies 5.5 miles N of Middle Island and shows a light on its W side. The **Hotspur Islets** (21°29'S., 150°16'E.), two islets connected by a reef, lie 1.2 miles N of Pine Peak Island.

Vernon Rocks (21°28'S., 150°19'E.) are a small group of four low, rocky islets which lie about 1.7 miles ENE of the Hotspur Islets. The group is about 0.5 mile long. The largest and N islet, from which a light is shown, is 7.6m high. A detached drying rock lies about 0.1 mile E of this islet.

Tides—Currents.—The tidal currents set strongly through the Percy Islands.

At the anchorage on the W side of Middle Island, spring tides rise 5.5m; neaps tides rise 4.2m.

Sphinx Islet, with a bare peak, lies 9.5 miles WSW of Vernon Rocks. Overfalls occur W of the N extremity of the islet.

The Northumberland Isles—West Groups

7.16 The W groups consist of the islands and dangers on the W side of that part of the Inner Route track. They extend about 67 miles NW from Steep Island, which is 10 miles N of Cape Townshend, to **Overfall Rock** (21°16'S., 149°38'E.).

The **Duke Islands** (21°58'S., 150°08'E.) lie between 19 and 29 miles NW of Cape Townshend, with the E islet about 6.5

miles WNW of **Otterbourne Island** (22°02'S., 150°18'E.). The group is about 10 miles in length and almost the same distance in width. They are surrounded by rocks, shoals, or sandbars, and unless necessary, vessels should avoid the area.

The tidal currents are strong through the Duke Islands. A rate of 5 knots has been experienced between the islands.

Anchorage.—Anchorage may be obtained with the help of local knowledge, 0.2 mile S of Iron Islet, off the W side of Marble Island, in depths of 10 to 11m. The nearer the anchorage is to the shore, the less the tidal current will be felt. This is the best anchorage in the Duke Islands.

Vessels with local knowledge can obtain anchorage 1 mile WNW of the W side of **Tynemouth Island** (22°00'S., 150°08'E.), in depths of 7 to 9m, out of the strength of the tidal current.

The Bedwell Group

7.17 The **Bedwell Group** (21°50'S., 149°48'E.) consists of five bare-topped islands, rocks, and shoals which lie 25 miles WSW of Pine Islets Light. **Poynter Island** (21°50'S., 149°48'E.), 122m high, is the largest islet in the group. Innes Island is the northernmost islet, George Island is the easternmost islet, and Calliope Island is the southernmost islet.

Smythe Shoals (21°44'S., 149°52'E.), with depths of less than 1.8m, are on a narrow steep-to ridge that extends about 9 miles NE from a position almost 2 miles NE of Innes Island. Emily Patches, the SW end of these shoals, is separated from the rest of the ridge by a 10.9m channel about 1 mile wide. The sea at times breaks over these dangers and they are usually marked by current rips. The tidal currents set obliquely across them at a rate of 1.5 to 2 knots.

Guardfish Cluster

7.18 The **Guardfish Cluster** (21°35'S., 149°51'E.) is a group of islets and dangers almost 10 miles long and about 6 miles wide. The cluster is centered about 14 miles N of the middle of the Bedwell Group.

Curlew Island (21°36'S., 149°48'E.), 458m high and the largest of the cluster, lies about in the center of the group. Peak Head, a prominent 138m hill at the N end of the island, is surmounted by a square boulder. The island is fringed by numerous islets, rocks, and shoal dangers.

Bluff Islet lies about 3 miles E of Curlew Island and is the easternmost of the group. It is rocky, flat-topped, and has a remarkable overhanging bluff at its NW extremity. Tinonee Peak Island, with a prominent 187m peak, lies about 3.5 miles ESE of Bluff Islet.

Anchorage.—Vessels may obtain anchorage in Davidson Bay, midway between **Treble Islet** (21°36'S., 149°50'E.) and Peak Head, in depths of 9 to 15m. The anchorage is easy to access from the S, but is only recommended as a temporary anchorage.

Garfish Bay affords good anchorage, but it is restricted and local knowledge is necessary. Vessels anchor, in depths of 7 to 15m, with shelter from E and SE winds. The anchorage is difficult of access owing to the shoals in the vicinity.

The Beverly Group

7.19 The Beverly Group (21°29'S., 149°53'E.), a chain of small, high rocky islets, extends about 7.5 miles NE of Digby Island, the southeasternmost of the group. Most of these islets are steep-to on their NE sides, but shoal water extends SW from some. Several extensive shoals lie up to 8 miles SW of this group.

The tidal currents set through the group at a rate of 1.5 to 3 knots at springs. The flood current sets SW and the ebb NE, and they cause heavy tide rips at each end of the group.

Digby Island (21°30'S., 149°54'E.) lies about 7.5 miles NE of Curlew Island. A drying ledge extends about 0.1 mile N from the N end of the island. Keelan Island, lies less than 0.2 mile NE of Digby Island, and the passage between them, is obstructed by shoals. Henderson Island lies about 0.2 mile N of Digby Island, and Noel Island lies 0.5 mile W of Digby Island.

Sappho Roads lies between Noel Island and Henderson Island. Several islets lie up to 3.5 miles NW of Sappho Roads and can best be seen on the chart.

Sappho Roads affords a somewhat protected anchorage. The best anchorage is in a depth of 20m close to Henderson Island. Shoal water, with depths of 9 to 16m, are found in the middle of the roads, but the tidal currents attain a rate of 2.5 to 3 knots and it is not recommended.

The inner part of the roads affords anchorage, in a depth of 8m, near the center. Sappho Roads are easy to access and are recommended for small craft unable to proceed S against strong SE winds, which often occur in winter.

7.20 Prudhoe Island (21°19'S., 149°40'E.), the NW and largest of Northumberland Isles, rises to a prominent peak, 331m high near its center. The W part of the island, a grassy ridge, is separated from the main part by a low neck of swampy ground. On the SW part of the neck there is a sandy beach where landings can be made. **Prudhoe Shoal** (21°19'S., 149°41'E.), with a least depth of 2.7m near its center, extends 1 mile S from the neck.

Anchorage may be obtained in a bay on the NE side of Prudhoe Island, and off the W side, in a depth of 26m, but the tidal currents in the latter attain a rate of 3 knots at springs. Anchorage may also be obtained off the E side of Prudhoe Shoal.

Caution must be exercised when seeking shelter on the SW side of Prudhoe Island, as soundings are not a safe guide, and greater depths lie close on each side of Prudhoe Shoal.

Prudhoe Channel (21°23'S., 149°43'E.) lies between Prudhoe Island and Double Island, on the NE side, and Beverley Group and Reid Islet, on the SW side; there are depths of more than 11m in the fairway. The narrowest part is at the W end where it is 1.5 miles wide. Care must be taken to allow for the tidal currents which set across it at a rate of 1.5 to 2 knots.

Viscount Shoals consists of a number of narrow sand banks, with depths of less than 11m, which lie roughly parallel with one another in a general N-S direction, W of a line joining **Elamang Islet** (21°28'S., 149°39'E.) and the Reid Islets. The W shoal, with a least depth of 3.7m, lies between positions 4.5 miles W of Elamang Islet and 5 miles W of Reid Islet. The E shoal, marked by overfalls on its W side, has a least depth of 4m, and lies 2 miles NW of Elamang Islet.

Caution.—Viscount Shoals form the NW termination of numerous dangers among the Northumberland Islets. Their origin is to be traced to the silt deposits from Broad Sound as most of the banks radiate from the entrance to that sound. Their configuration and general direction indicate that tidal currents are active agents in the formation of these narrow sand and mud ridges, and it is highly probable that many changes will continue to take place in them.

Great Barrier Reef—Inner Edge

7.21 It must be remembered that the following reefs and islets are the prominent ones marking the limits of the inner edge of the Great Barrier Reef, and vessels should keep SW of a line joining them.

Alarm Reef (21°07'S., 150°15'E.), a steep-to reef that dries 0.3m, lies about 21 miles N of the Hotspur Islets.

Prince Reef, which dries, is a steep-to patch about 3 miles NNE of Alarm Reef.

Sandpiper Reef lies about 10 miles WNW of Alarm Reef. Redbill Islet lies about 3.2 miles NW of Sandpiper Reef.

Parker Reef (20°33'S., 149°45'E.), which dries 4.6m, lies on the W side of a coral reef about 0.7 mile in diameter. This part of the barrier reef between Alarm Reef and Parker Reef lies 8 to 19 miles E and NE of the E side of the S islets of the Cumberland Islands

Tideway Reef lies about 31 miles NNW of Parker Reef and has rocks and shoal water lying up to about 1 mile W of it. Vessels are cautioned to keep at least 5 miles W of a line from Parker Reef to Tideway Reef, as the area between them has not been examined.

Bait Reef (19°49'S., 149°04'E.), which dries, lies about 35 miles WNW of Tideway Reef. The reef is about 1.7 miles long and steep-to, with depths of over 37m close around, except on the NW side where there is a depth of 12.8m. The W end of Hook Reef, which extends about 8 miles E, lies about 1.5 miles E of Bait Reef. Beacons stand on the SE and SW extremities of the reef; two beacons stand on the NW extremity of the reef.

Hydrographer's Passage

7.22 Hydrographer's Passage (19°47'S., 150°24'E.) through the Great Barrier Reef allows deep-draft vessels access to the inner route. The passage, with a least depth of 25m, has a total length of 83 miles from the pilot boarding station at the seaward entrance to its junction with the Inner Route.

Pilotage.—See paragraph 7.2 for pilotage information following the heading "Navigation in the Great Barrier Reef."

Caution should be exercised when approaching the boarding ground as a line of shoals lies about 2 miles to the SW. The passage consists of a relatively narrow but well-surveyed corridor through the Great Barrier Reef, and extreme care should be taken to maintain a position within this channel, as the bordering areas are unsurveyed.

Caution.—Extensive local knowledge is required for the approach to, and the navigation of, this passage, particularly at the seaward entrance.

Vessels are strongly urged to contact local authorities before attempting passage.

West Hill Island to Slade Point

7.23 West Hill Island (21°50'S., 149°29'E.), 300m high near its E end, appears as a conspicuous detached wooded hill which lies less than 0.5 mile off the mainland. The W side of the island is low and connected to the mainland by a drying flat.

Anchorage may be taken, in 7.3m, about 1 mile off the E side of the island, with the summit of the island bearing about 277°.

Between West Hill Island and Cape Palmerston, about 18 miles N, the coast trends in that direction and is mostly low with a number of rocky points. Mount Funnel, 351m high, lies about 2.5 miles inland and about 7 miles SW of Cape Palmerston. This conspicuous mountain has been seen clearly for a distance of 42 miles.

Notch Point (21°44'S., 149°29'E.) lies about 5 miles N of West Hill Island, and the coast between these two features is indented about 3 miles W of a bight, most of which dries. Green Hill lies about 3 miles NNW of Notch Point.

The Temple Islets, fringed by rocks and foul ground, lie up to 2.5 miles offshore, about 7.5 miles N of Notch Point. These islets are separated from the mainland by a narrow channel encumbered with drying rocks.

Cape Palmerston (21°32'S., 149°29'E.), 43m high and bare, is a bluff, rocky headland, and the N extremity of a peninsula which extends 3.7 miles N from **Coconut Point** (21°36'S., 149°28'E.). The E side of the peninsula, fringed with rocks, an above-water reef, and drying rocks on which there are several stunted mangroves, extends 1.5 miles from the cape.

Between Cape Palmerston and **Freshwater Point** (21°25'S., 149°20'E.), the coast is indented about 4.5 miles SW by two inlets. Glendower Point, which separates these inlets, lies about 5 miles NW of Cape Palmerston. Cullen Islet lies about 6.5 miles N of Cape Palmerston. Phillips Reef, about 0.5 mile long, is a drying patch about 2.5 miles S of Cullen Islet.

Coaster Channel (21°26'S., 149°32'E.) lies between **Sandy Shoals** (21°50'S., 149°33'E.), **Stony Shoals**, **Torch Shoals**, **Yaralla Shoals**, and **Viscount Shoals** on the E side, and the mainland on the W side. The channel should not be used without local knowledge.

Hay Point (21°18'S., 149°18'E.), bare and rocky, lies about 9 miles NNW of Freshwater Point. A below-water rock lies 0.7 mile ESE of the point. Hay Reef, a coral ledge which dries 2.1m, extends 0.5 mile N from the point. A lighted buoy is moored 0.1 mile N of the reef.

Mount Griffiths, 74m high, lies 1.5 miles SW of Hay Point.

A light is shown at the Harbormaster's Office, a red brick building on Mount Griffiths.

7.24 Port of Hay Point (21°16'S., 149°19'E.) (World Port Index No. 53405) consists of conveyor jetties which extend 1 mile ENE and 2 miles NE from the vicinity of Hay Point. Hay Point Services (HPS) stands at the seaward end of the S conveyor, while Dalrymple Bay Coal Terminal stands at the end of the N conveyor; both are conspicuous. Together they are the largest coal export facility in the Southern Hemisphere.

Queensland Ports Corporation

http://www.pcq.com.au/html/02_ports.htm

Tides—Currents.—The tidal current sets 160° on the flood tide and 340° on the ebb tide. The maximum rate is 2 knots. Slack water occurs about 1 hour 30 minutes before HW and LW.

Depths—Limitations.—Vessels in ballast can approach the S wharf from any E direction. The approach to the N wharf from the SE is dredged to 13m.

The Hay Point Services berths are situated at the head of the S conveyor jetty and consists of two dolphin berths. HPS Berth No. 1 has a total length of 397m with an alongside depth of 16.6m. Vessels of up to 150,000 dwt can be accommodated. HPS Berth No. 2 has a total length of 450m and an alongside depth of 16.7m.

Dalrymple Bay Coal Terminal is situated at the head of the N conveyor jetty and has three berths. Berth No. 3, the northernmost berth of the three, has a charted depth of 18.9m. Berth No. 1, located at the middle of the pier, has a length of 490m between the dolphins and depths alongside of 17.9m. Berth No. 2, just S of Berth No. 1, has a depth of 18.3m. The terminal will accommodate vessels of up to 200,000 dwt.

The bottom at the berths is mud and silt.

Vessels should have an underkeel clearance of at least 1.5m while berthed alongside. On departure, ships can proceed directly to sea. They are required to have an underkeel clearance of 10 per cent of their draft plus 0.6m.

Pilotage.—Pilotage is compulsory and available 24 hours. Pilots are stationed at Hay Point and board vessels at one of three lettered boarding positions approximately 2 miles NNE, NE, or E of the berth. Pilots usually board by helicopter. The pilot launches also run lines.

The ETA of a vessel is required 7 days, 48 hours, and 24 hours in advance.

A port radio station is maintained at Hay Point.

Pilots can be contacted on VHF channels 14 and 16.

Anchorage.—Numbered anchor berths are charted N1 through N15; the S anchorage has seven berths S of the approach route from the ENE. Berths are assigned by Harbor Control.

A restricted area for ship loading, the limits of which are shown on the chart, lies NE of the wharfs. Unauthorized vessels are prohibited from mooring, anchoring, or maneuvering in this area.

Between Hay Point and Slade Point, about 13 miles NNW, the coast is indented about 4 miles WSW by a bight. Dudgeon Point lies about 2.7 miles NW of Hay Point; there are depths of less than 5.5m up to about 1 mile offshore between them. In 1973, two shoals of approximately 11m were reported to lie 3.5 and 4 miles NE of Hay Point.

Mackay (21°09'S., 149°13'E.)

World Port Index No. 53400

7.25 Mackay Outer Harbor, the port facility for Mackay, is situated about 2.5 miles S of Slade Point. The town of Mackay lies on the S bank of the mouth of the Pioneer River, which is so shallow that it dries.

Winds—Weather.—Mackay lies within the section of the Queensland coast most frequently visited by typhoons. With the exception of these severe tropical storms, pressure systems

usually pass without causing extremes in weather. Southeast winds are very common in this area.

High winds will at times build up heavy seas outside the harbor, causing vessels to surge excessively at their berths. The surge is generally accentuated during rising tides.

Tides—Currents.—At the entrance to Mackay Outer Harbor, the flood current sets S and the ebb current sets N, at a rate of 2.5 knots at springs and 1 knot at neaps. It has been found that vessels of 4,000 grt may enter safely when the rate of the current does not exceed 1.5 knots. Large vessels should not attempt to enter port when there is more than 0.5 knot of tidal current running at the entrance. Small vessels will have no difficulty entering at any time. Currents inside the harbor during the ebb are very weak. During flood tide, the current inside the harbor sweeps toward Breast Wharf and then veers W and eddies under the pier.

The tidal current in the river attains a rate of 3 to 4 knots. Slack water occurs about 1.5 hours before HW and LW. The ebb current reaches its maximum at about HW, but soon decreases.

The tidal rise is 5.5m at MHWS and 4.2m at MHWN.

Depths—Limitations.—Vessels utilizing the port enter at slack water. Vessels are limited to a length of 155m and must maintain an underkeel clearance of 0.6m.

The approach channel has a depth of 8.5m to the turning basin inside the breakwater, which has a maintained depth of 8.3m. Lesser depths may be encountered close to the Northern Breakwater within the Harbor Swing Basin.

Berth 1 to Berth 4 offer facilities for handling bulk liquid, bulk solid, container, and general cargo. Berth 2 is reported (2002) to be disused.

Bulk Grain Wharf Berth 5, on the N side of the harbor, handles bulk grain cargoes. Love's Jetty, with a depth of 3.4m, can accommodate passenger and pleasure craft.

A number of large mooring buoys lie in the N part of the harbor.

Mackay Port Facilities (2002)

Berth	Length	Depth	Max. Length	Remarks
1	123m	10.7m	210m	Petroleum, molasses, tallow, and ethanol.
2	190m	10.1m	188m	General cargo, fertilizer, iron, and bulk liquid chemicals.
3	315m	13.1m	—	Bulk raw sugar.
4	225m	10.6m	—	Bulk refined sugar and general cargo.
5	165m	12.3m	270m	Bulk grain.

Aspect.—Flat Top Island, SE of East Point, is marked by a light. Leading lights, in line bearing 288°, lead N of the Downward Patches to Mackay Outer Harbor.

Pilotage.—Pilotage is compulsory and should be requested 24 hours in advance. Pilots should be advised, via the agent, whether pilot transfer can be accomplished by helicopter or if a launch is required. Pilots board about 2 miles ESE of Southern Breakwater. Vessels should contact Mackay VTS 2 hours prior to arrival on VHF channel 14 or 16.

Regulations.—Vessels should maintain a continuous listening watch on VHF channels 14 and 16 while at anchor or alongside a berth.

Prior to berthing, vessels are required to have:

1. The propeller fully immersed.
2. A trim of not more than 2.5m by the stern. Trim by the head is not permitted.

Vessels carrying more than 10kg of explosives shall not proceed past the anchorage.

An agent or master shall obtain a permit to handle dangerous cargo at least 24 hours in advance of the cargo movement.

Masters are advised not to maneuver W of a line between Slade Island and Flat Top Island.

Anchorage.—Anchorage may be taken, in depths of 12 to 14m, about 1.5 to 2 miles E of Slade Islet.

Vessels of light draft may anchor, in about 7.3m, about 0.5 to 0.7 mile NW of the NW side of Flat Top Island.

Anchorage is prohibited in the area, best seen on the chart, located S of Slade Island.

The Cumberland Islands—South Groups

7.26 The SE group of the Cumberland Islands is comprised of the S group and the Sir James Smith Group, a chain of islands which extends from Snare Peak Island to Silversmith Island, 56 miles WNW. The islands are mostly high, rocky, and thickly wooded, particularly with pine trees.

Snare Peak Island (21°06'S., 149°56'E.), the southernmost of the Cumberland Islands, rises to a peak 88m high. Snare Rocks, 1.2m high, lie 1.7 miles E of the island.

Penrith Island lies about 5 miles NNW of Snare Peak Island. It is steep to on its NE side, but a reef fringes the S and W sides up to about 1 mile offshore. A light is shown on the summit of the island. Derwent Island lies 5.5 miles WNW of Penrith Island.

Bailey Island (21°02'S., 149°33'E.) has two rocks, which dry 1.2m, off its NW extremity. A light is shown from the summit of the islet.

Scawfell Island (20°52'S., 149°37'E.) rises to a peak, 397m high, SE of Duddon Point, the N extremity of the island.

Anchorage.—Anchorage with good shelter may be obtained, in a depth of 13m in Refuge Bay, on the NW side of the island. Calder Island, 143m high, lies 4 miles N of Scawfell Island.

St. Bees Island (20°55'S., 149°27'E.) lies on the W side of Cumberland Channel, about 8 miles WSW of Scawfell Island. Keswick Island is separated from St. Bees Island by Egremont Pass.

Anchorage.—Anchorage may be obtained in the N entrance of the pass, in a depth of 16m, 0.5 mile W of Schooner Rock. Small vessels with local knowledge can find shelter in the pass, but care must be taken.

Wigton Island (20°44'S., 149°28'E.), 127m high, wooded, and cliff-faced on its NE side, lies 8 miles WNW of Calder

Island. Cockermouth Island lies 3.7 miles SW of Wigton Island.

Anchorage.—Anchorage may be obtained, in a depth of 27m, 0.5 mile N of the NW extremity of Cockermouth Island. Silloth Rocks lie on the E side of a drying reef between Cockermouth Island and Wigton Island.

Carlisle Island (20°47'S., 149°17'E.) is wooded and rises to Skiddaw Peak, 393m high, close within its N extremity. Brampton Island lies SW of Carlisle Island and is connected to it by a drying reef and sandbar.

Anchorage.—Maryport Bay, on the W side of Carlisle Island, affords a sheltered anchorage, except in winds from between NE and W. A light is shown from a rock lying off the W end of Brampton Island.

7.27 The Sir James Smith Group (20°38'S., 149°08'E.) consists of several groups of small islands and dangers which make up the northernmost of the S part of the Cumberland Islands.

Linne Island (20°40'S., 149°11'E.), 284m high near its N extremity and wooded, lies 0.5 mile NW of Tinsmith Island and is the highest and most remarkable of the Sir James Smith Group. The S part of the island is joined to the main part of the island by a low neck. A bank, with a least depth of 7.6m, lies 0.5 mile W of Linne Island.

Goldsmith Island (20°41'S., 149°09'E.), 194m high near its N end, lies 0.5 mile W of Linne Island. An islet, 7.6m high, lies close E of its N extremity.

Anchorage.—Anchorage, sheltered from SE gales, may be obtained off the NW side of Goldsmith Island.

Locksmith Island lies 0.5 mile N of Goldsmith Island. Depths of less than 20m extend 0.5 mile NE and SW, respectively, from the island. Overfalls occur between Locksmith Island and Goldsmith Island.

The **Ingot Islands** (20°43'S., 149°08'E.) lie on a spit with depths of less than 11m, which extends 1.5 miles S from Goldsmith Island. No attempt should be made to pass between the islands or between the N island and Goldsmith Island.

Anchorage.—Anchorage, with shelter from N winds, may be obtained 0.5 mile E of the N Ingot Island, with good holding ground.

Coppersmith Rock lies 3.7 miles NNW of Locksmith Island. It is located on the S end of a drying reef which extends about 0.1 mile NW from the rock. A light is shown from the rock.

A number of islets, rocks, and shoals lie off the above-mentioned islands and can best be seen on the appropriate charts.

Slade Point to Cape Conway

7.28 Slade Point (21°04'S., 149°14'E.) lies 2.5 miles N of Mackay Outer Harbor. The point consists of a hilly promontory fringed by rocks within less than 0.2 mile offshore. The E side of the point is fairly steep-to with depths of about 9.1 to 10.9m close to shore.

Shoal Point, about 5.5 miles NW of Slade Point, is the rocky extremity of a grassy projection that slopes down from the hills backing the coast. Several drying patches lie about 1.2 miles SE and SSE of the point. Green Islet lies about 1 mile N of the point and is connected by a drying reef.

Llewellyn Shoal (21°00'S., 149°19'E.), with a least depth of 4.5m, lies about 6 miles NE of Slade Point. Hunt Shoal, an 8.2m patch, lies about 1.7 miles ENE of Llewellyn Shoal.

Blackwood Shoals are a number of rocky patches, covered with light sand, with depths of less than 10.9m and with a least depth of 1.8m, extending about 8 or 9 miles off the coast between Slade Point and Cape Hillsborough. Vessels should not navigate in this area without local knowledge.

Cape Hillsborough (20°54'S., 149°03'E.) is a conspicuous, bold headland, 259m high, faced in places by steep sandstone cliffs. Elsewhere, its seaward face is thickly wooded with large pine trees, but its summit is bare. The cape is connected to the mainland by a low, scrub-covered isthmus. Pinnacle Rock, a conspicuous peaked hill, rises 3 miles WSW of the cape.

The Red Cliff Islets, two in number, lie on a drying reef which extends 1 mile N from **Finlayson Point** (20°53'S., 148°57'E.). The islets are very conspicuous.

Port Newry (20°51'S., 148°56'E.) is entered between Mausoleum Islet and Outer Newry Island. A safe harbor for small vessels lies between Outer Newry Island and Newry Island. The fairway between these islands is narrow and the bottom is soft mud.

Anchorage.—Anchorage in the channel S of Newry Island is exposed to E winds.

7.29 The Stewart Peninsula (20°47'S., 148°50'E.), 127m high and wooded, forms the N side of St. Helens Bay. Dewars Point, the SE extremity of the peninsula, forms the N entrance point of the bay. The peninsula is separated from the mainland by a mangrove swamp.

The Repulse Islands, a group of small rocky islands covered with grass and a few trees, lies near the middle of the entrance of Repulse Bay, 11 miles NNE of the Stewart Peninsula.

Anchorage.—Anchorage may be obtained by small vessels among the islands which afford good shelter if care is taken.

Repulse Bay (20°35'S., 148°48'E.) indents the coast between Midge Point and Cape Conway. The land is low and flat on the W side of the bay and hilly on its N and NE sides. The Proserpine River, navigable by small craft for about 9 miles, lies at the head of the bay. The whole of Repulse Bay, with the exception of the NE part, has depths of less than 11m. There are depths of less than 5.5m extending up to 2.5 miles from the W shore and the head of the bay.

The Cumberland Islands—The Lindeman Group

7.30 The Lindeman Group (20°30'S., 149°05'E.), the S group of the N group of the Cumberland Islands, is comprised of the islands between Thomas Island and Pentecost Island.

Thomas Island (20°33'S., 149°07'E.), 182m high and the S island of the group, lies 9.5 miles E of Cape Conway. This steep-to island has several smaller islets and foul ground fringing it up to a little over 0.2 mile offshore.

Anchorage.—Small vessels with local knowledge may obtain anchorage, in a depth of 4m, inside the islet off the bay on the N side of Thomas Island. Anchorage may also be obtained, in a depth of 20m, 0.5 mile NE of the W extremity of the island, but it is open to N winds.

Keyser Island (20°32'S., 149°05'E.) lies 2 miles NW of Thomas Island and is 79m high and bare. Long Rock lies on a

drying reef, 0.2 mile SW of Keyser Island. Volskow Islet, with its upper part covered with trees, lies 0.7 mile NE of Keyser Island. Triangle Island, bare and rocky, lies 1.5 miles NE of Volskow Islet.

Mansell Island (20°28'S., 149°08'E.) is 192m high with a flat, grassy summit. Apart from the summit, the island is bare and cliff-faced. An 8.2m patch lies 0.5 mile W of the S extremity of the island. Comston Island, low and cliffy, lies 0.7 mile WNW of Mansell Island.

Shaw Island, with its SE end about 0.5 mile W of Keyser Island, is a narrow island about 6 miles long. Shaw Peak, 404m high, lies near the N end of the island, and a 253m peak lies near the S end. The E side of the island consists of cliffs and sandy bays, mostly fringed by drying coral reefs. The W coast forms the E side of Kennedy Sound. Shaw Island is reported to be uninhabited.

Anchorage.—Anchorage may be obtained in Neck Bay on the W side of Shaw Island, 1.2 miles NE of Yellow Rock.

The anchorage, sheltered from all except N winds, is in a depth of 13m, but is susceptible to strong sudden squalls during SE winds. The anchorage lies in the strong tidal currents in Kennedy Sound.

Anchorage may also be obtained, in a depth of 20m, 0.7 mile ENE of Burning Point, but it lies in the strong tidal current.

Lindeman Island (20°27'S., 149°02'E.) lies about 1.2 miles W of the N end of Shaw Island. The island, which is 212m high, is a tourist resort, and a hotel is situated near its S extremity. A light is shown from the SSW side of the island.

Seaforth Island (20°28'S., 149°02'E.), 51m high, lies 0.5 mile S of the S extremity of Lindeman Island. Spitfire Rock, which dries, lies about 0.2 mile WSW of Seaforth Island.

Anchorage.—Anchorage may be obtained, in a depth of 13m, about 0.5 mile E of the N extremity of Seaforth Island. It is one of the better anchorages of the Lindeman Group. An alternative anchorage, in a depth of 8m, lies 0.3 mile SE of the N extremity of Seaforth Island.

The Cumberland Islands—The Whitsunday Group

7.31 The Whitsunday Group (20°15'S., 149°00'E.), the N group of the N group of the Cumberland Islands, is comprised of the islands between Dent Island and Hayman Island, 19 miles to the NNW.

Dent Island (20°22'S., 148°56'E.) lies on the E side of Whitsunday Passage at the SW extremity of the Whitsunday Group. The island is steep-to on its S and W sides. Reefs and shoals almost connect the NE end of Dent Island with the S end and E side of Henning Island, about 0.7 mile to the N. A light is shown on the W side of Dent Island.

Anchorage.—Anchorage, in depths of 15 to 27m, may be obtained off the N end of Dent Island.

Anchorage is prohibited in most of Dent Passage.

Hamilton Island lies about 0.5 mile E of Dent Island from which it is separated by Dent Passage, a narrow strait. **Henning Island** (20°19'S., 148°56'E.) lies about 0.7 mile N of Dent Island.

Aspect.—A conspicuous mast stands on a hill 0.5 mile SE of the NW point of Hamilton Island.

An airfield is situated S of a marina, which is situated 1 mile S of the N point of the island. Vessels navigating Dent Passage are advised to keep clear of the runway when aircraft are taking off or landing.

A shoal depth of 2.4m lies close off the point 0.4 mile N of the runway beacon.

Anchorage.—Vessels with local knowledge may take sheltered anchorage about midway between Henning Island and Whitsunday Island, in a depth of 29m.

Whitsunday Island (20°15'S., 149°00'E.), the largest of the Cumberland Islands, lies with Reef Point, its W extremity, about 1.5 miles N of Henning Island. The island is about 8.5 miles wide and 10.5 miles long. Most of the numerous bays and inlets which indent the island are encumbered with shoal water and reefs. Cid Island, which shows a light, lies about 0.5 mile N of Reef Point.

Anchorage.—Cid Harbor affords anchorage, in depths of 11 to 15m, good holding ground. Anchorage can also be taken in White Bay, on the E side of Whitsunday Island, in a depth of 13m, and, in a depth of 9m, 0.6 mile W of **Tongue Point** (20°14'S., 149°01'E.). An anchorage area has been established just E of Henning Island in Fitzalan Passage.

7.32 Edward Island (20°15'S., 149°10'E.), the SE island of the Whitsunday Group, is 106m high. Foul ground extends 0.7 mile E from the island, and near its outer end is a rock 6.1m high, with another above-water rock between it and the island. A light is shown from Edward Island. An isolated depth of 6.2m lies 19 miles ENE of the light.

Border Island, 228m high, lies 9 miles NW of Edward Island.

Anchorage.—Anchorage with shelter from S winds, may be obtained in **Catara Bay** (20°10'S., 149°02'E.), on the N side of the island, in depths of 15 to 20m, 0.5 mile W of the NE extremity of the island.

Hook Island (20°06'S., 148°55'E.) lies N of Whitsunday Island, from which it is separated by a narrow channel. There is a least depth of 11m in the fairway of the channel, for which local knowledge is essential. Hook Island is wooded and rises to Hook Peak (20°06'S., 148°56'E.), the highest summit in the Cumberland Islands. The island is about 7 miles long and 3.5 miles wide.

The S coast of Hook Island is indented by Macona Inlet and Nara Inlet, which are separated by a peninsula. Both inlets extend N for 2.7 miles, and are fringed by drying coral reefs.

Macona Inlet is fronted by a bar, with depths of 3.7m in the fairway. Nara Inlet has depths of 6.7 to 8.5m, but its entrance is obstructed by a bank, with depths of less than 5.5m. In 1978, a dangerous rock was reported to lie in the fairway across the bar fronting Macona Inlet. A light is shown from the E entrance point of Nara Inlet. A lighted beacon stands close off the entrance point of Macon Inlet.

Pinnacle Point (20°03'S., 148°58'E.), on which a light is shown, rises to a height of 18m just within the NE extremity of Hook Island. Several rocks above and below-water extend about 0.2 mile NE from the point. There are tide rips E of these rocks.

Anchorage.—Butterfly Bay lies 1.5 miles WSW of Pinnacle Point and affords anchorage to vessels with local knowledge; the E side of the bay has the better anchorage.

7.33 Langford Islet lies about 5.5 miles WSW of Pinnacle Point. A steep-to drying reef extends 1 mile SE and S of the islet. Bird Islet lies on the W side of this reef about 0.5 mile S of Langford Islet. A light is shown from Bird Islet.

South Channel lies between Baird Point and the drying reef 1.1 miles NW. A detached shoal, with a depth of 7.3m, was reported (1990) to lie 0.2 mile NNE of Baird Point.

Hayman Island (20°03'S., 148°53'E.), 247m high, lies about 0.7 mile NW of the NW end of Hook Island and is the northernmost of the Cumberland Islands. A small harbor, dredged to 4.5m, is situated at the SW end of Hayman Island at the W end of a tourist resort.

Anchorage.—Anchorage may be taken, in 24m, with the S end of the harbor pier bearing 046°, 0.3 mile.

Stonehaven Anchorage (20°06'S., 148°53'E.) lies S of Hayman Island, between Hook Island and the Langford Islet reef. There are depths of about 12.8 to 28m throughout most of Stonehaven Anchorage and more than 18.3m in the fairways of all the channels leading into it. Although any of the channels may be used in entering, South Channel, between the SE end of the Langford Islet reef and Hook Island, is wide and easy to enter.

The tidal currents are weak in Stonehaven Anchorage but they may attain a rate of 1.5 knots in the narrower entrance channels. At the anchorage, the flood current sets S and the ebb current sets NW.

Vessels may take anchorage, with good holding ground, in 14.6m, about 0.4 mile NNW of Anchor Point. An aircraft mooring buoy is moored E of the anchorage. Depths at the anchorage vary from 11 to 27m.

Cape Conway to Pioneer Point

7.34 Between Cape Conway and Pioneer Point, about 20 miles NNW, the bold hilly coast trends quite regularly in that direction and rises abruptly to heights of 419m, about 0.5 mile inland. Although most of this coast is rocky, some of the bays and inlets have drying mud and sand flats bordered by mangroves. This part of the coast and its adjacent islands lie on the W side of Whitsunday Passage.

Round Head (20°29'S., 148°54'E.) lies about 3.5 miles NNW of Cape Conway and is the extremity of a peninsula that extends about 1.5 miles E from the mainland. Genesta Bay indents the coast about 1.2 miles W on the S side of Round Head.

Anchorage.—There is good anchorage in the bay, in depths of 5 to 9m. Anchorage may also be obtained by vessels with local knowledge, in depths of 5 to 11m, in Puritan Bay on the N side of the promontory of which Round Head is the SE extremity.

Long Shoal, composed of hard sand, which dries 0.6m near its S end, lies with that end 1.5 miles NE of Cape Conway, and extends 4 miles NNW. The shoal is steep-to, and the E and N end are marked by overfalls and eddies. The channel inshore of Long Shoal should not be used without local knowledge.

Long Island (20°22'S., 148°52'E.), 269m high, lies with its S end about 5 miles NNW of Round Head. This narrow island is

about 5 miles long, S to N, and lies from about 0.2 mile to 1.2 miles offshore. East Rock, 10.4m high, lies a little over 0.2 mile off the E side of the island. Pine Island lies about 0.7 mile ENE of the S end of Long Island. Strong eddies occur off both ends of Pine Island and vessels should not approach within 0.5 mile of these points. Radio towers stand near the N end of Long Island.

7.35 Port Molle (20°19'S., 148°51'E.) is suitable for large vessels which use Whitsunday Passage or Molle Channel, entered between South Head (20°19'S., 148°52'E.) and Denman Island, 2 miles N. Only high-powered vessels of moderate draft should use Long Island Sound owing to the strong tidal currents.

Anchorage.—Anchorage out of the strength of the tidal currents may be obtained, in depths of 13 to 15m, mud, 0.6 mile N of **Humpy Point** (20°20'S., 148°51'E.).

Rooper Inlet lies between **Stripe Point** (20°19'S., 148°49'E.) and The Beak, 2.5 miles NNW. The shores of the inlet are fringed with mangroves and at its head is Shute Bay which is shallow. The inlet is encumbered with shoal water and a number of islets and dangers lie in its entrance. Shute Islet, the largest of these dangers, lies about 1.5 miles NNW of Stripe Point. A lighted beacon stands on the edge of the reef close off the N extremity of the islet. Low Reef lies 0.2 mile NNE of Shute Islet. Low Rock lighted beacon stands on the E side of the reef. Repair Island lies W of Shute Islet and shows a light. A light stands on The Beak.

Vessels without local knowledge should not attempt to navigate between the islets in the entrance of Rooper Inlet.

Anchorage.—Small vessels with local knowledge may take anchorage in Rooper Inlet, in 5.5m.

Molle Island (20°16'S., 148°50'E.), 194m high and the southernmost of the Molle Group, lies about 1.5 miles E of The Beak.

Anchorage.—Vessels may take anchorage on the W side of Molle Island about 0.3 mile NNW of Roma Point (20°17'S., 148°50'E.) and about 0.2 mile offshore, in depths of 18 to 24m, good holding ground. During the ebb current an eddy sets S in this anchorage.

7.36 Mid Molle Island is a narrow islet at the N end of Molle Island to which it is connected by a short causeway.

North Molle Island (20°13'S., 148°49'E.) lies 0.2 mile N of Mid Molle Island. The two islands are separated by a narrow channel, suitable only for boats, in which there is a strong tidal race.

West Molle Island (20°15'S., 148°49'E.) lies 1 mile SW of Mid Molle Island, and is 47m high and reef-fringed. There is a village on the W side of the island near the S end. West Molle Island and the dangers surrounding it are covered by the red sector of The Beak Light. Leading lights are shown close together at the N end of West Molle Island. In line bearing 240.5°, they lead through Unsafe Passage. The passage E of the island should not be used by low powered vessels.

Molle Channel, which lies between the Molle Islands on the E side and the mainland from Stripe Point to Pioneer Point on the W side, is deep and wide, the narrowest part being between the reef extending S from West Molle Island and The Beak. There are depths of more than 37m in the fairway.

Caution.—A submarine power cable and pipeline are laid across Molle Channel from a position 0.8 mile W of The Beak to West Molle Island. The submarine power cable then crosses to SE to Molle Island.

Pioneer Point (20°14'S., 148°46'E.), a rocky, tree-covered islet, is connected to the mainland S. Pioneer Rocks, which dry 3m, lie 0.5 mile NW of Pioneer Point, with below-water rocks extending 0.1 mile S. A lighted beacon stands on the rocks.

Anchorage.—Anchorage may be obtained, in a depth of 11m, W of Pioneer Point, sheltered from S winds.

Pioneer Point to Cape Edgecumbe

7.37 Pioneer Bay (20°14'S., 148°42'E.), entered between Pioneer Point and Grimston Point, 6 miles NW, has depths of less than 11m within a line joining the entrance points. Pigeon Islet, 9.1m high, lies at the head of the bay on the edge of a drying bank. The villages of Cannonvale and Airlie, each with a small jetty, lie 0.7 mile S and 1 mile E, respectively, of Pigeon Islet. A marina, with a breakwater marked by lighted beacons, is situated close N of Airlie.

Grimston Point is the N extremity of a narrow peninsula, 24m high and 2.7 miles long, which projects NNE from the mainland, and is covered with rocks and grass. The point is 84m high; the E side is steep-to.

Anchorage.—Anchorage may be obtained in the lee of the point during SW gales.

A series of small bays and inlets indent the coast between Grimston Point and George Point, about 9 miles NW. Although most of these are clear of dangers, some of them are fringed with reefs, which can best be seen on the chart.

Grassy Island (20°09'S., 148°37'E.) lies about 3.7 miles N of Grimston Point and about 1.2 miles offshore. A drying reef fringes the S side of the island up to about 0.5 mile offshore.

Anchorage.—Anchorage may be obtained, in a depth of 7m, 0.7 mile off the S side of the island. This anchorage is sheltered from N winds.

Gumbrell Island (20°06'S., 148°36'E.), doubled-peaked and 91m high, lies about 2.2 miles N of Grassy Island. Depths of less than 10.9m lie up to 0.5 mile N and S of the island; a reef extends about 0.1 mile from its SW point. The Armit Islands and Double Cone Island lie about 1.7 miles and 5.5 miles E of Gumbrell Island, respectively.

Anchorage.—Anchorage may be obtained, in a depth of 24m, mud, NW of Double Cone Island.

Eshelby Island lies 5 miles N of Gumbrell Island. Overfalls occur off the NE side of the island during the flood tide. A light is shown from the island. Rattray Island lies 4 miles WNW of Eshelby Island. There are tide-rips off the N extremity of Rattray Island.

Anchorage.—Anchorage may be obtained, in a depth of 18m, off the W side of Rattray Island. There is also good anchorage off the S side, in depths of 11 to 15m, mud.

7.38 George Point (20°04'S., 148°34'E.) is the NE extremity of a cliffy promontory, which rises to a height of 296m about 1.2 miles SSW. A bank, with a depth of 17.7m, lies 0.5 mile NE of George Point.

Saddleback Island is doubled-peaked and lies 1 mile WNW of George Point.

Anchorage.—Anchorage may be obtained in SW winds in the lee of George Point.

Cape Gloucester lies 5 miles W of Saddleback Island and is the N termination of a range of hills and peaks. Gloucester Passage lies between Cape Gloucester and the S side of Gloucester Island and has a least depth of 1.8m in the fairway at its W end. The passage should only be used with great caution by small vessels with recent local knowledge, and never at night.

Gloucester Island (20°00'S., 148°27'E.) extends about 5 miles N from Gloucester Passage to Gloucester Head, the N extremity of the island. Mount Bertha, 577m high, lies in the middle of the island.

Anchorage.—Anchorage, with shelter from S and E winds, may be obtained, in depths of 7 to 13m, in Bona Bay on the SW side of the island. Anchorage may also be taken in the lee of Cape Gloucester, in depths of 5 to 9m.

Middle Island, 55m high, lies in the middle of the entrance to Edgecumbe Bay, between Gloucester Head and Cape Edgecumbe. The island is rocky, reddish colored, flat-topped, and sparsely wooded. A drying reef extends 0.2 mile S from the island. Caution should be exercised approaching this reef as it is steep-to.

Edgecumbe Bay (20°05'S., 148°22'E.) indents the coast between Middle Island and the head of the bay. The E side of the bay rises abruptly, but the head of the bay is a low mangroved shore. Ben Lomond, 438m high, is a remarkable sugarloaf hill that rises at the SE end of the bay. The W side of the bay is low, but is backed by a number of hills.

Port of Bowen (20°01'S., 148°15'E.), formerly a coal-exporting port, is no longer used by commercial vessels, its trade having been taken over by Abbot Point Coal Wharf. The wharves are run down and are only used by fishing vessels and by tugs which service Abbot Point Coal Wharf.

Cape Edgecumbe to Cape Bowling Green

7.39 Cape Edgecumbe (19°59'S., 148°16'E.), the W entrance point of Edgecumbe Bay, is low and fringed with reefs up to about 0.5 mile offshore. North Rock, 1m high, lies on the NE edge of the reefs, almost 0.5 mile NNE of the cape. Edgecumbe Heights is a short range of hills that extend about 1 mile S from the cape. A prominent boulder is located on the highest summit of these hills.

Holbourne Island, 112m high, is covered with grass and bushes on its S side and lies about 16 miles offshore, NNE of Cape Edgecumbe. A light is shown from the island.

Anchorage.—Temporary anchorage is afforded, in a depth of 16m, on the W side of the island.

7.40 Abbot Bay (19°51'S., 147°57'E.) lies between Abbot Point and the NE extremity of the peninsula of which Cape Upstart is the NW extremity, 16 miles NW. The shores of the bay are low, sandy, and intersected by creeks, except on the E side of the promontory, which is high and steep. A light is shown on Bald Hill.

There is a coal exporting terminal at Abbot Point. A trestle jetty and coal conveyor extend 1.5 miles NNE from Abbot Point, terminating at a wharf aligned 109°-289°.

Queensland Ports Corporation

http://www.pcq.com.au/html/02_ports.htm

Winds—Weather.—Winds from the SE can average 20 to 30 knots for periods of as long as two continuous weeks. Northeast to SE winds average 15 to 20 knots for much of the year.

Depths—Limitations.—There is a depth of 17.1m in the approaches.

The trestle jetty has a berthing length of 264m, with dolphins at each end and an alongside depth of 19.3m.

The terminal accommodates vessels of up to 165,000 dwt.

Aspect.—Lights mark the E and W approaches to the wharf.

Leading lights, in line bearing approximately 225°, are shown near Abbot Point; the rear light of this pair is Bald Hill Light.

Leading lights, in line bearing approximately 164°, are shown near Abbot Point; the rear of this pair is the front light of the 225° alignment above. A lighted beacon stands 2 miles NNW of Abbot Point.

Pilotage.—Pilotage is compulsory. The pilot boards about 3.7 miles NNW of the Abbot Point trestle jetty. The vessel's ETA should be forwarded 7 days, 48 hours, 24 hours, and 6 hours prior to arrival.

There is a port radio station at Abbot Point.

Anchorage.—The anchorage, in 19.3m, is situated 4.2 miles NNE of Abbot Point.

Anchorage is afforded small vessels with local knowledge, in a depth of 5m, 0.3 to 0.4 mile W of Mount Luce, but the swell frequently causes a vessel to roll heavily.

7.41 Cape Upstart (19°42'S., 147°45'E.) is a hilly promontory that extends about 8 miles N from the mainland and rises abruptly to heights of 738m. The cape is conspicuous and has been reported to give good radar returns up to 17 miles.

Anchorage.—Anchorage can be obtained by vessels with local knowledge, in depths of 7 to 13m, off a small sandy beach close S of Cape Upstart.

Upstart Bay is entered between Cape Upstart and **Beach Hill** (19°44'S., 147°35'E.), 9.5 miles WSW. Depths of less than 5.5m extend up to 1 mile offshore for a distance of 3.5 miles S of Cape Upstart. The SE and E part of the head of the bay are formed by drying mud banks, which extend 1 mile offshore. A number of shallow creeks and inlets intersect the low mangrove shore at the head of the bay. A light is shown from the E side of the entrance to Molongle Creek located at the head of the bay.

The Burdekin River, navigable only by boats with local knowledge, flows into the sea about 3 miles N of Beach Hill. Although the river mouth is about 1.5 miles wide, it is encumbered with sandbanks and bars that extend about 2 miles offshore. During E winds, the sea breaks heavily over these dangers. A light is shown from the S entrance, about 9 miles WSW of Cape Upstart.

Plantation Creek (19°32'S., 147°30'E.), about 7 miles NNW of the Burdekin River mouth, is accessible by small craft with local knowledge. This part of the coast is fronted by shoals and partly drying sandbanks.

Cape Bowling Green (19°18'S., 147°26'E.), low and sandy, is the N extremity of Russel Island. This island is located close N of a low narrow neck that extends about 6.5 miles NNW from the mainland close N of the mouth of Alva Creek. It forms the E side of Bowling Green Bay. A light is shown near the S end of Russel Island. The cape has been reported to give good radar returns up to 14 miles.

Anchorage.—Small vessels with local knowledge can take anchorage in the lee of Russel Island. Larger vessels may take anchorage W of a shoal, located about 4 miles W of Cape Bowling Green Light, in depths of 3.6 to 7.3m, mud and sand.

A wreck over which there is a depth of 11.4m lies about 13 miles due E from Cape Bowling Green.

Bowling Green Bay to Luncinda Point

7.42 Bowling Green Bay (19°22'S., 147°15'E.) indents the coast about 10 miles S between Cape Bowling Green and Cape Cleveland, about 25 miles WNW. Shoals, with irregular depths of less than 1 to 5.5m, encumber much of the bay and lie up to 5 miles offshore in its E and central parts. In the W part of the bay they lie up to 1.5 miles offshore.

Several high mountains back the low coast to about 4.5 miles inland from the SW side of the bay. Saddle Mountain, 868m high, lies about 15 miles S of Cape Cleveland. A conspicuous tower stands on the N slope of this mountain. **Mount Eliot** (19°29'S., 146°58'E.), a conspicuous level-topped mountain, 1,233m high, lies about 19 miles S of Cape Cleveland.

Chunda Bay lies about 7 miles SSE of Cape Cleveland. The bay is filled by a drying sandbank and fringed with mangroves. A lighted radio mast stands 3 miles WSW of the S entrance point to the bay and a light is shown from a jetty on the N side of the bay.

Cape Cleveland (19°11'S., 147°01'E.) is the N extremity of a hilly peninsula that extends about 6 miles N from the mainland. The cape has been reported to give good radar returns up to 23 miles. A light is shown on the N end of the cape and is an excellent visual aid in approaching Townsville. There is a signal station at the light. Salamander Reef, which dries 1.2m, lies about 3 miles E of Cape Cleveland.

Cleveland Bay indents the coast about 8 miles S between Cape Cleveland and Cape Pallarenda, about 13.5 miles W. The shores of the bay are fronted by sand and coral grit, or sand and mud banks, which dry up to 2.1m, and are backed by mangroves. A number of creeks enter the bay through shallow entrances at the head of the bay. The port of Townsville lies on the SW side of the bay.

Anchorage.—Anchorage for small vessels may be obtained off the W side of Cape Cleveland.

7.43 Magnetic Island (19°09'S., 146°50'E.) lies with Nobby Head, its S extremity, 3.5 miles E of Cape Pallarenda, and is separated from it by West Channel. The island is studded with peaks which are thickly wooded and covered with immense granite boulders. Mount Cook, 495m high, the highest peak, rises near the middle of the island and has a light, which is an

excellent visual aid in the approach to Townsville. The SE side of the island forms the NW side of Cleveland Bay and is indented by a number of small bights.

Bremner Point (19°09'S., 146°52'E.), with a jetty on its SW side, lies about 2.5 miles SSW of the NE end of the island.

A conspicuous stranded wreck lies about 0.7 mile NW of Nobby Head.

Picnic Bay, which lies between Nobby Head and **Hawkins Point** (19°11'S., 146°51'E.), is filled by a drying reef, near the middle of which is a beacon which marks a submarine cable. A jetty extends from the SW side of the bay. A lighted beacon marks the E end of a spur of the coastal reef, about 0.5 mile ESE of Nobby Head.

Bay Rock (19°07'S., 146°45'E.), on which a light is shown, lies about 1.5 miles WNW of West Point, the W extremity of Magnetic Island. It lies in the approach to West Channel and the Port of Townsville.

Townsville (19°15'S., 146°50'E.)

World Port Index No. 53380

7.44 The port of Townsville, the principal port in northern Queensland, includes all of Cleveland Bay, as well as Magnetic Island. The port is relatively small but remains fairly busy, with a rather high volume of merchant traffic. The harbor for the port is located at the city of Townsville, on the SW side of Cleveland Bay, about 11.5 miles WSW of Cape Cleveland. The main approach is made through Cleveland Bay from the NE, but light draft vessels from the N may use West Channel.

Winds—Weather.—The climate is dry and tropical. The region has a high summer rainfall, with an average annual total of 1,134mm. July is the coolest month, with an average temperature of 20 C, while January is the warmest month, with an average temperature of 28 C.

Tides—Currents.—The tidal rise at the wharves is 2.9m at MHWS, and 1.9m at MHWN. The currents in the vicinity do not appear to be a hindrance. Flood currents generally run WSW, in the direction of Palm Passage, shifting to the S between Magnetic Island and the Great Barrier Reef. Ebb currents flow opposite, running N to Palm Passage, then turning ENE through the passage. During the flood tide, it has been reported that there is a strong set to the W upon exiting the Eastern Breakwater.

Townsville Port Authority

<http://www.townsville-port.com.au>

Depths—Limitations.—Sea Reach Channel, the first leg of the approach fairway, is entered 0.7 mile SE of Bremner Point. Platypus Channel only allows traffic in one direction at a time. Both Sea Reach Channel and Platypus Channel are extremely well marked with large channel markers. The deepest water lies in the centers of the channels and therefore critical for deep draft vessels to use the fixed ranges (leads) to keep within the center of the channels. The width of the channel averages only about 68m.

The approach depths were reported (2003), as follows:

1. Sea Reach Channel—11.7m.

2. Platypus Channel—11.7m.
3. Outer Harbor Arrival Channel—7.8m.
4. Outer Harbor Departure Channel—11.7m.

West Channel, which lies between the shore bank extending NE and NNW from Cape Pallarenda and the dangers fringing the SW side of Magnetic Island, trends SE into Cleveland Bay. The channel is about 1.2 miles wide between these dangers. Middle Reef, marked by lighted beacons, lies about in the middle of the inner end of this channel. The channel has depths of 3.6 to 6.1m and is suitable only for shallow-draft vessels. It should not be used at night without local knowledge.

Ross River Channel, which runs parallel to the W breakwater, trends SW from the harbor entrance and over a rocky bar into the mouth of Ross Creek. The channel is marked, and had a least depth of 1.4m in 2001. After heavy rains, a considerable amount of silt may be deposited in this channel.

The harbor complex offers nine berths, with the facilities to handle a variety of cargo types.

Townsville Port Facilities (2003)				
Berth	Length	Depth	Max. Length	Remarks
1	250m	12.2m	238m	Outer end of E breakwater. Bulk petroleum products.
2	281m	12.6m	238m	General cargo.
3	283m	12.6m	238m	Containers and ro-ro.
4	220m	10.6m	238m	Ro-ro and molasses.
6	122m	—	—	Condemned. Not in use.
7	183m	11.0m	195m	West side of E pier. Bulk ore.
8	213m	10.3m	220m	East side of W pier. Freezer.
9	230m	11.9m	228m	West side of W pier. Bulk sugar.
10	160m	9.3m	152m	Ro-ro.
11	240m	10.8m	195m	Bulk ore.
Note. —The following underkeel clearances are required: <ol style="list-style-type: none"> 1. All vessel movements—0.9m. 2. Alongside all berths—0.6m. 				

Pilotage.—Pilotage is compulsory; vessels requesting pilotage should radio their ETA to the Harbormaster, Townsville at least 24 hours in advance. Vessels with a draft of 8m or greater are boarded about 3.5 miles NE of Bremner Point, for Sea Reach Channel. Vessels of less than 8m draft are boarded about 1 mile ESE of Bremner Point, for Platypus Channel.

Regulations.—The port limits line is best seen on the chart.

The quarantine line is drawn across the channel about 2 miles NNE of the breakwater heads. Vessels are boarded at the pilot station.

Explosives are usually discharged to lighters at the anchorage off Bremner Point.

Signals.—Berthing signals are displayed from the Port Control Tower on W pier. A green flag by day, and a green quick flashing light at night, indicates the final position of the vessel's bridge on docking.

The Port Closed signal is displayed from the tower and consists of the answering pennant, by day, or an occulting red light, at night.

Anchorage.—Anchorage may be obtained, in a depth of 9.1m, good holding ground, 0.7 mile SSW of Bremner Point. Small vessels using West Channel may obtain good anchorage sheltered from NE winds, in a depth of 5m, 1.2 miles NNE of Cape Pallarenda.

Directions.—Cleveland Bay is easily distinguished and entered. The approach channels are well-marked by lighted ranges and lighted beacons.

Caution.—Care is advised, as the channel and berths are subject to silting. The latest Notice to Mariners, and the local authorities, if possible, should be consulted for any changes in depths.

The beacons are situated 18 to 27m outside the limits of the dredged channel.

The pilot will call harbor control to turn on range lights when necessary. The ranges are hard to distinguish when the lights are not activated.

Cape Pallarenda to Lucinda Point

7.45 Between Cape Pallarenda and Lucinda Point, about 47 miles NNW, the coast recedes about 12 miles SW to form a long bight known as Halifax Bay. This coast consists of a low wooded shore from which numerous creeks empty. There are numerous lagoons behind the coast at the head of Halifax Bay, and there are mangrove swamps in the vicinity of Lucinda Point.

Burdekin Rock (19°08'S., 146°42'E.) lies 5.2 miles NNW of Cape Pallarenda. The rock is about 15m long and awash at LWS. Paluma Shoals, consisting of a number of rocks, some of which are awash, lies 9 miles WNW of Burdekin Rock. A submarine pipeline, marked at the shore end and the seaward end by lights, extends about 1 mile NE from the shore, about 4.5 miles WSW of Burdekin Rock.

Eleanor Creek (18°52'S., 146°17'E.), navigable by boats for about 6 miles, empties into the head of Halifax Bay. Lady Elliot Reef, with a depth of less than 1m, lies about 11 miles NNE of the mouth of Eleanor Creek. Victoria Creek lies about 14 miles NNE of Eleanor Creek.

Off-lying Islands and Dangers

7.46 Rattlesnake Island (19°02'S., 146°37'E.) lies 13 miles NW of Cape Pallarenda.

Anchorage.—Vessels can take anchorage during SE winds in the W part of the bight on the N side of the island, in 7.3 to 9.1m, 0.7 mile NW of the summit of the island. Lorne Reef, which dries 0.3m, lies 1 mile W of Rattlesnake Island.

Bramble Rock lies about 0.5 mile NE of the E end or Rattlesnake Island. Submerged rocks extend almost 0.2 mile from the S and NW sides of Bramble Rock. **Herald Island** (19°02'S., 146°38'E.) lies about 0.5 mile E of Rattlesnake Island. Reefs fringe the island up to 0.2 mile off its S and W sides, but its E side is steep-to. There are depths of 1.8m between Herald Island and Rattlesnake Island.

In 1990, a rock, awash, was reported to lie 0.1 mile W of Bramble Rock.

Cordelia Rocks (19°00'S., 146°41'E.), several rocks on a steep-to coral reef, lie about 3.2 miles ENE of Herald Island. Vessels should not pass within less than 0.5 mile of the W side of Cordelia Rocks.

Acheron Island lies about 4 miles NNE of Rattlesnake Island. The N and W sides of the island are fringed with rocks. Phillips Reef, a 1.8m patch, lies almost 1.2 miles SW of the W end of this island.

A submerged wreck, with a depth of 9.1m, was reported in 1986 to lie 0.9 mile SE of the E end of Acheron Island. **Havannah Island** (18°50'S., 146°33'E.) lies about 8.5 miles NW of Acheron Island. The island has two peaks separated by a low gap. Rocks and reefs fringe the island up to about 0.2 mile offshore. Fly Islet lies 0.5 mile NW of Havannah Island.

Pandora Reef, almost 0.7 mile long E to W, lies about 5.5 miles W of Fly Islet. A coral cay on the E end and a sandbank on the W end of the reef are awash at high water.

7.47 Great Palm Island (18°45'S., 146°38'E.), the largest of the Palm Isles, is about 8.5 miles long. A ridge of hills, which extend the length of the island, rises abruptly from the coast to the 554m summit of Mount Bentley, in the middle of the island. The S and NE sides of the island and its E end are fringed by reefs and rocks up to almost 0.7 mile offshore. Rocks and reefs fringe the W side up to 1 mile offshore. Barber Islet lies off the S side of the island.

Albino Rock (White Rock) is a steep-to pinnacle that lies about 1.5 miles SE of the SE end of Great Palm Island. A light is shown on the summit of the rock; the light structure has been reported to give good radar returns up to 10 miles.

Challenger Bay (18°44'S., 146°34'E.) lies on the W side of Great Palm Island. The bay affords anchorage, in depths of 7.3 to 9.1m, sand.

Eclipse Island lies about 1 mile SW of Great Palm Island from which it is separated by Steamer Passage, a clear deep channel. Foul ground fringes this islet up to about 0.1 mile offshore; a drying coral reef extends 0.5 mile NW from the islet.

7.48 Curacao Island (18°40'S., 146°33'E.) lies about 0.5 mile NW of the NW end of Great Palm Island. These two islands are separated by Calliope Channel. This channel is not recommended, but may safely be used by favoring the E side of Curacao Island. Curacao Channel lies on the W side of Curacao Island, and separates Curacao Island from Fantome Island.

Fantome Island (18°41'S., 146°31'E.) lies about 0.7 mile W of Curacao Island. The island has two wooded summits separated by a low, narrow neck of land. The N summit slopes down to a low, sandy plain on which there is a hillock. A leprosy hospital is situated on the hillock.

Anchorage.—Anchorage may be obtained on the W side of the island in Juno Bay, in depths of 11 to 15m, 1.2 miles SSW of the NW extremity of Fantome Island.

A depth of 16.6m lies at the E extremity of a bank, with lesser depths W of it, extending NE for about 1.5 miles from the S point of Fantome Island.

Orpheus Island is separated from the NW extremity of Fantome Island by a narrow channel, 0.2 mile wide, with a depth of 2.7m. A jetty, 15m long, is situated on the W side of the island 2.2 miles N of Harrier Point. The channel to the jetty is marked by small buoys.

Hazard Bay and Pioneer Bay on the W side of the island, afford good anchorage, in a depth of 13m, coral, 0.7 mile offshore.

Pelorus Island (North Palm Island) (18°33'S., 146°30'E.), 282m high and wooded, lies 0.5 mile N of Orpheus Island, and is steep-to. In 1978, a depth of 14.6m was reported 1 mile W of Pelorus Island.

Tides—Currents.—Tidal currents in the channel between Orpheus Island and Pelorus Island are strong, usually setting in the opposite direction to that of the tidal current outside at that time.

Caution.—An isolated depth of 15.4m lies 0.7 mile W of Pelorus Island.

Lucinda Point to Double Point

7.49 Lucinda Point (18°31'S., 146°20'E.) on which a light is shown, is a low point on the S side of the S entrance of Hinchinbrook Channel. The town of Lucinda is situated close W of the point. A pier and some conspicuous tanks and warehouses are situated in the town. Drying sandbanks extend about 2 miles E from Lucinda Point, and a shorebank, with depths of less than 1.8m, extends about 2.7 miles ENE from the point.

Hinchinbrook Island (18°22'S., 146°15'E.), about 19 miles long, S and N, and about 6 to 13 miles wide, is contiguous with the coast, about 0.5 mile to 3 miles S and SW from which it is separated by Hinchinbrook Channel. The island is high and rugged and has a range of hills and mountains extending from SE to NW across most of its length. Mount Bowen, about in the middle of the island, is the most prominent peak.

Hinchinbrook Channel is composed of two entrances, N and S. The S entrance lies between Lucinda and George Points and is obstructed by a bar, which extends 3 miles offshore, across the greater part of the entrance. There is a least depth of 3.3m in the channel over the bar. Small vessels use this entrance, but deep-draft vessels use the N entrance. A pair of leading lights bearing 247° lead into the S entrance.

During fresh NE winds, a heavy surf breaks over the bar. The flood current sets through the N and S entrances at a rate of 1 to 3 knots.

Within the bar, there are depths of more than 2.7m in the channel to the wharf at Lucinda.

After bad weather, some of the navigational aids may be out of position or missing.

The N entrance to Hinchinbrook Channel is obstructed by a bar, which extends W from Goold Island to the mainland, and SW from the island to the N shore of Hinchinbrook Island. In

1989, there was a least depth of 3.3m in Hinchinbrook Channel, and a 3.7m patch close E of the fairway, 0.6 mile WNW of Lucinda inshore berth. Depths are liable to change and for the latest information on depths in the Hinchinbrook Channel and the berths, see the Australian Temporary Notices to Mariners.

The N entrance is sheltered from all winds except those from the N.

7.50 Port of Lucinda (18°31'S., 146°20'E.) (World Port Index No. 53370), formerly known as Hinchinbrook, is mainly used to export raw sugar.

Queensland Ports Corporation

http://www.pcq.com.au/html/02_ports.htm

Depths—Limitations.—The inshore molasses wharf, which lies in the town of Lucinda, is L-shaped with a 133m face and an alongside depth of 9m. The pier is no longer in use and has been in disrepair since 1989.

Extending from the root of this wharf, a 3-mile long jetty extends seaward; at the outer end is a 213m long bulk sugar-loading facility. A vessel of up to 50,000 dwt can berth at this wharf. The depth alongside the berth is 13.6m. An obstruction, with a depth of 12m, lies close to the N end of the berth.

Pilotage.—Pilotage is compulsory and should be arranged through the Harbormaster, Townsville in advance. Pilots for the bulk sugar facility are embarked 1.5 miles NNE of the facility, off the S entrance bar. Vessels using the N entrance to Hinchinbrook Channel board the pilot off **Cardwell** (18°15'S., 146°02'E.).

Anchorage.—Vessels can take anchorage inside the N entrance of Hinchinbrook Channel, E of Cardwell and about 1.2 miles S of Hecate Point, in 7.3 to 14.6m. Small vessels may anchor, in a depth of 6m, 0.7 mile WSW of Hayman Point, the NW extremity of Goold Island.

Rockingham Bay to Double Point

7.51 Rockingham Bay (18°08'S., 146°07'E.) is entered between Cape Sandwich and **Dunk Island** (17°57'S., 146°10'E.), 17 miles NNW. Although open to the E, shelter may be obtained W of Goold Island or W of Dunk Island. The Brook Islands, four in number, lie on the SE side of Rockingham Bay. A light is shown on the S island of the group.

A number of rivers and creeks empty into the bay. The **Murray River** (18°05'S., 146°02'E.) is navigable by small craft with local knowledge and a draft of not more than 2.4m.

Anchorage.—Anchorage may be obtained in the Murray River close S of the N entrance point, in a depth of 4m.

The **Family Islands** (18°02'S., 146°12'E.) form a line of seven high, rocky islets that extend about 5.5 miles SE from a position about 2 miles E of Tam O'Shanter Point.

Dunk Island, about 3.2 miles long, lies with its SE end about 4.5 miles E of Tam O'Shanter Point. The island rises to a 270m summit near its N end. The island has been reported to give good radar returns up to 20 miles. A rock, 12.2m high, lies close off the SE end of the island.

Mound Islet lies about 0.5 mile W of the N end of Dunk Island.

Anchorage.—Vessels can take anchorage about 1 mile W of Mound Islet, in 9.1 to 14.6m, good holding ground. Small craft can anchor SW of the islet.

Between Tam O'Shanter Point and Double Point, about 19 miles N, the coast trends in that direction and consists mostly of sandy beaches. In places, it is closely backed by a number of hills; higher mountains are farther inland.

Clump Point (17°52'S., 146°08'E.), a low rocky point that extends about 1 mile NE from the coast, lies about 7.5 miles N of Tam O'Shanter Point. Clump Mountain, about 716m high, lies about 2 miles WNW of Clump Point.

Murdering Point (17°46'S., 146°07'E.), low and sandy, lies about 5 miles N of Clump Point. Foul ground and coral heads, awash at LW, fringe the point up to about 2 miles offshore and extend E to King Reef.

King Reef (17°47'S., 146°10'E.), a number of rocks that dry about 1.8m, lies almost 3 miles E of Murdering Point. Foul ground lies between the reef and the coast. A current sets toward the land in the vicinity of King Reef during SE winds and particularly with the rising tide.

The **South Barnard Islands** (17°45'S., 146°10'E.), two adjacent islets, lie on a reef about 3.5 miles ENE of Murdering Point. Stephens Island is the N islet and has been reported to give good radar returns up to 16 miles.

Anchorage.—During SE winds, vessels of moderate draft may take anchorage in the lee of Stephens Island, in a depth of about 6m.

7.52 Double Point (17°39'S., 146°09'E.) rises abruptly from the sea to an isolated hill and is prominent because of the low flat country in its vicinity. Several rocks fringe the point within about 0.2 mile offshore. Except for the North Barnard Islands, the point is clear of dangers and is fairly steep-to.

The North Barnard Islands, several high and fairly steep-to islets, form a line that extends about 2 miles SE from a position about 0.5 mile SE of Double Point. Vessels without local knowledge should not attempt to use some of the passages between the islets. Vessels should pass at least 1 mile E of Kent Island.

Kent Island, 95m high and on which a light is shown, lies about 2.5 miles SE of Double Point. The island has been reported to give good radar returns up to 18 miles.

Jessie Island, 58m high, and Hutchison Island, 85m high, lie almost 0.2 and 0.5 mile W, respectively, of Kent Island. Bresnahan Islet, 19.2m high, lies about 0.2 mile N of Hutchison Island.

Lindquist Island (17°39'S., 146°09'E.), 39m high, lies almost 0.7 mile NW of Bresnahan Islet and its NW end lies 0.5 mile SE of Double Point. A rock, awash, lies midway between this island and Bresnahan Islet. Foul ground lies up to a little over 0.2 mile W of Lindquist Island.

Anchorage.—Vessels with local knowledge can take anchorage, sheltered from SE winds, NW of Kent Island, in about 14.6m.

Between Double Point and a point 1.2 miles NNW, there is a sandy beach, backed by land similar to that S of Double Point.

An islet, 25m high, lies close offshore, 0.5 mile NW of Double Point. The coast to the entrance of Mourilyan Harbor, 1.7 miles NNW, is steep and rock fringed.

7.53 Mourilyan Harbor (17°36'S., 146°08'E.) (World Port Index No. 53360) lies just inside the estuary of the Moresby River and includes all navigable waters within the entrance which lies between two headlands. The harbor lies just within this entrance and is deep but confined. A wharf lies on the N side just inside the entrance and is used to load sugar and molasses. Live cattle exports also take place.

Queensland Ports Corporation

http://www.pcq.com.au/html/02_ports.htm

Tides—Currents.—The tidal current at the harbor entrance can attain a rate of 3 knots at springs. The stronger incoming current sets towards the S between Hall Point and Camp Point, then WNW across the harbor towards the berth.

The outgoing current from the Moresby River sets onto the berth, turning E through the entrance channel, then N along Hall Point.

Depths—Limitations.—The entrance channel (2002) has a width of 91m and a depth of 9.6m. Vessels having a beam of up to 28m are authorized to a deep draft of 8.5m; vessels of up to 32m of beam may carry a draft of 7.4m, according to the tide. The swinging basin is 366m wide, with a depth of 6.7m. The bottom of the entrance channel is rock; in the swinging basin the bottom is soft mud.

The Sugar Berth consists of a concrete wharf, 190m long, with a depth of 10.1m alongside. The maximum ship size accommodated has a length of 185m, a beam of 32m, and a draft of 10.5m.

Pilotage.—The pilot will make initial contact with the ship about 30 minutes prior to boarding time. The pilot boards on the range line, about 2 miles E of the harbor entrance, about 30 minutes prior to the predicted time of slack water.

Large vessels should only enter the harbor during daylight hours. A minimum depth of 0.9m under the keel is required when navigating through the entrance channel.

Anchorage.—Anchorage may be obtained S of the entrance lead in the swinging basin, in a depth of 7m.

Mourilyan Harbor to the Fitzroy Islands

7.54 The coast between the entrance to Mourilyan Harbor and **Thompson Point** (17°32'S., 146°05'E.), 5 miles NW, is formed by rocky points, with sandy beaches between, backed by steeply rising hills of the Moresby Range. Etty Bay, a village, is situated on the coast, 1.7 miles SE of Thompson Point.

Meaburn Rock (17°34'S., 146°10'E.), with a depth of 3m, and steep-to except on its W side, lies about 2.5 miles NE of the entrance of Mourilyan Harbor and almost 3 miles ENE of **Mount Leeper** (17°35'S., 146°06'E.). This steep-to danger is marked on its S side by a lighted buoy. Two wreck, with depths of 16.2 and 8.5m, lie 0.5 mile NNE of Meaburn Rock.

From Thompson Point to the S entrance point of Gladys Inlet, about 1.5 miles NNW, a partly-drying shorebank extends up to 1 mile offshore.

Flying Fish Point (17°30'S., 146°05'E.), about 1.5 miles N of Thompson Point, lies on the N side of the entrance of Gladys Inlet and the Port of Innisfail. A white lighted beacon is shown from Flying Fish Point. A lighted buoy is moored about 0.1 mile E of the lighted beacon.

Port of Innisfail (17°31'S., 146°02'E.) includes all the navigable waters of Gladys Inlet and the Johnstone River inside the 7m curve off the entrance to the inlet. The entrance, less than 0.2 mile wide, lies between two points 0.7 mile W of Flying Fish Point. The entrance and the river are encumbered with sandbanks and are navigable only by small craft with recent local knowledge, and a draft of not more than 2.4m at springs, and 1.2m at neaps, for a distance of 12 miles.

Range lights are situated on Flying Fish Point. These lights are moved as necessary to indicate the deepest water available. There are several small wharves in the river at the town of Innisfail, with depths alongside of 1.5 to 3.6m.

Anchorage.—Anchorage may be obtained by small vessels with local knowledge off Croquette Point, in depths of 4 to 5m.

Between Flying Fish Point and **Cooper Point** (17°24'S., 146°04'E.), about 6.5 miles to the N, a dangerous rock, with a minimum depth over it of 1.8m, lies close NW of Cooper Point. Heath Point, about 1.5 miles N of Flying Fish Point, rises abruptly to the summit of Mount Maria, about 0.5 mile to the W. The rest of the coast is low, but backed by hills about 2 miles inland. A patch of rocks, which dries 1.2m, lies about 0.5 mile E of Heath Point.

Caution.—Because of the steep-to nature of the above shorebank, which also extends offshore from the coast N of Cooper Point, vessels should not approach the coast within 2.5 miles in this vicinity.

7.55 Cooper Point rises abruptly from the sea to the conical summit of Mount Cooper. A ridge of hills connects the point with the summit of Mount Arthur. This mountain is the highest of the coastal range in this vicinity.

Bramston Point (17°15'S., 145°59'E.), which is rocky, lies about 10 miles NNW of Cooper Point. The land rises abruptly to several summits up to 730m high, within 1.5 miles SSW of the point. The estuary of the Mulgrave River indents the coast about 1 mile W from its narrow entrance, about 1.7 miles NNW of Bramston Point. The estuary and the rivers are navigable only by small craft with local knowledge.

The **Frankland Islands** (17°13'S., 146°05'E.) are a group of islets that lie about 7 miles E of the estuary of the Mulgrave River and the Russell River.

Russell Island (17°14'S., 146°06'E.), which shows a light from its summit, lies about 6.5 miles ENE of Bramston Point. Russell Island has been reported to give good radar returns up to 18 miles. A small islet lies close NE of the NE end of Russell Island, to which it is connected at LW. Foul ground extends up to 0.5 mile NW from the island and elsewhere fringes the island for a distance of 0.2 mile.

Mabel Island and **Normanby Island** (17°12'S., 146°05'E.) are two adjacent islets on a coral reef that lies about 1.7 miles NW of Russell Island. Foul ground fringes both of the islets. Grange Rock and Jones Patch lie up to 0.5 mile S of Mabel Island.

High Island (17°09'S., 146°01'E.) lies about 4.5 miles NW of Normanby Island. The N and W coasts of the island are fringed with rocks.

Tobias Spit (17°08'S., 146°00'E.), with depths of less than 9.1m, sand and mud, extends 1.2 miles N from High Island.

Anchorage.—Anchorage may be obtained on Tobias Spit, but with strong winds there is a rough sea. In S winds, anchorage may be made close to the island.

7.56 Palmer Point (17°10'S., 145°58'E.) is a rocky point at the foot of a spur of the coastal range that attains a height of 791m about 2 miles inland and 3 miles WNW of the point. Between Palmer Point and Deception Point, about 13.5 miles NNW, the coast forms a bight that recedes about 3 miles to the W. The coastal range closely backs this part of the coast to a position about 2.5 miles SW of Deception Point.

Fitzroy Island (16°56'S., 145°59'E.) lies about 3 miles ENE of Deception Island. The island has been reported to give good radar returns up to 21 miles. The dangers fringing the island are contained within the 5m curve, which lies up to 0.2 mile offshore. An islet lies close off the NE end of the island. A light is shown from the NE side of the island. A signal station is situated at the light. A light is also shown from the head of a jetty on the W side of the island. The channel between the island and the mainland is about 2 miles in width and has depths of about 26 to 33m.

Anchorage.—Anchorage can be taken nearly 0.5 mile off the NW side of the island, in 14.6 to 18.3m.